日本産ワセンチュウ科の分類学的研究(3)

誌名	農業環境技術研究所報告
ISSN	09119450
著者	皆川, 望
巻/号	5号
掲載ページ	p. 123-173
発行年月	1988年3月

農林水産省 農林水産技術会議事務局筑波事務所
Tsukuba Office, Agriculture, Forestry and Fisheries Research Council Secretariat

Bull. Natl. Inst. Agro-Environ.
Sci., **5**, 123—173 (1988)

Taxonomic Studies of Criconematidae (Nematoda: Tylenchida) of Japan
III. Genera *Ogma* and *Pseudocriconema*

Nozomu MINAGAWA*

(Received November 6, 1987)

Synopsis

The genus *Ogma* was redefined and key to the world species was provided. The subgenus *Homogma* SIDDIQI, 1986 was treated as a junior synonym of *Crossonema* (s. str.), and other subgenera of *Ogma* proposed by SIDDIQI (1986) were removed from this genus. One new and four known species of *Ogma* were recorded in Japan. *Ogma trigonolepidum* n.sp. was obtained from rhizosphere of woody plants in Mt. Aso, Kumamoto, and Mt. Akagi, Gunma. This new species is characterized by ten longitudinal rows of body scales, stout annules and short stylet; and it can be separated from other species with the same number of scale rows by the shortest stylet (43-50 μm), lesser number of annules (R=54-61), and more anterior location of excretory pore (Rex=15-19). The female adults, male adults and juvenile stages of the following four species of *Ogma* were also described and figured: *O. brevistylum* TOIDA, 1983; *O. octangulare* (COBB, 1914) SCHUURMANS STEKHOVEN & TEUNISSEN, 1938 (new to Japan); *O. coffeae* (EDWARD *et al.*, 1970) ANDRÁSSY, 1979; and *O. decalineatum* (CHITWOOD, 1957) ANDRÁSSY, 1979 (New to Japan). Genus *Pseudocriconema* which was regarded to a junior synonym of *Ogma* (s.str.) by SIDDIQI (1986) was revived, and gave a partly revised definition as a distinct genus and redescription of the type species, *P. japonicum*.

Introduction

The third part of this series is provided descriptions of one new and four known species of the genus *Ogma* SOUTHERN, 1914 including two new recorded forms from Japan, and their closely related species, *Pseudocriconema japonicum* in our country.

The genus *Ogma* is characterized in the family Criconematidae by thick body; round, rect- or triangular scales of body annules arranged in eight to twenty-one longitudinal-rows; and presence of submedian lobes. Species of this genus had been treated as those of genus *Criconema* HOFMÄNNER & MENZEL, 1914 for a long time (TAYLOR, 1936; THORNE, 1949, 1961: GOODEY, 1951; GOODEY, 1963; BAKER, 1962; GOLDEN 1971; ANDRÁSSY, 1976). MEHTA & RASKI (1971) created subgenus *Variasquamata* in *Criconema*, and they transferred all the species except the type of the genus to it. The type species, *C. guernei* (CERTES, 1889), remained in *Criconema* (s.

---

*Division of Microbiology, Department of Environmental Biology, National Institute of Agro-Environmental Sciences, Kannondai, Tsukuba, Ibaraki, 305 Japan.

Present address: Agriculture, Forestry and Fisheries Research Council Secretariat, Ministry of Agriculture, Forestry and Fisheries, Kasumigaseki 1-2-1, Chiyoda, Tokyo, 100 Japan.

str.) because that it was insufficiently described and had not been obtained again until that time. KHAN and others (1976) rose *Variasquamata* from subgenus to generic rank. ANDRÁSSY (1979), however, regarded to *Criconema* as "*genus dubium*", and proposed to revive the generic name *Ogma* SOUTHERN, 1914. He adapted it for *Criconema* spp., and made *Variasquamata* to the junior synonym of *Ogma*.

In 1984, RASKI and his collaborators reported the rediscovery of *Criconema guernei* from the type locality, Orange Bay in the Hoste Is., the southern extremity of the South America, after the almost centennial blank from its first detection, and redescribed its female, male and juvenile stages (RASKI, LUC & VALENZUELA, 1984). Subsequently they also published the accurate definition of the genus (RASKI & LUC, 1984). According to their studies, the type species of the true *Criconema* is that of the genus having been referred to *Nothocriconema* DE GRISSE & LOOF, 1965, and that *C. guernei* (=*Eubostrichus guernei*) is the juvenile stage bearing the triangular scales. Its female adult was regarded to the different organism and named *Dorylaimus giardi* CERTES, 1889. The latter was designed as the valid name of this nematode and the type of *Criconema*.

In the other hand, SIDDIQI (1986) proposed the further amendment of the definition of *Ogma*, and made seven subgenera and several synonyms to the genus in his recent monograph of Tylenchida, however, the author does not agree with his proposals. Details are discussed in the diagnosis and remarks of the genus.

In Japan, *Criconema gracile* MEHTA & RASKI, 1971 (= *Ogma coffeae* EDWARD *et al*., 1970), and *O. brevistylum* TOIDA, 1983 were reported from mulberry fields (TOIDA, OHSHIMA & HIRATA, 1978; TOIDA & MOMOTA, 1981; TOIDA, 1983). Additionally *O. octangulare* (COBB, 1914), *O. decalineatum* (CHITWOOD, 1957), and another undescribed species were obtained. Their descriptions and figures are presented in this paper. Other species recorded as *Criconema* spp. in Japan were departed from this genus.

The genus *Pseudocriconema* was erected for the sigle Japanese species (MINAGAWA, 1984). Recently SIDDIQI (1986) synonymized it with *Ogma* (s.str.), however, this genus has unique features by the intermediate characters between *Ogma*, and *Crossonema* and its allies. It is considered to be an independent from the other genera of the family. Partly revised definition of *Pseudocriconema* and redescription of the type species, *P. japonicum*, are also provided herein.

Abbreviations used, the method of nematode extraction from soil, and of the microscope preparations should be referred to the first part of this series (MINAGAWA, 1986).

Results and discussion

Genus *Ogma* SOUTHERN, 1914

SOUTHERN, 1914, p. 65-67; SCHUURMANS STEKHOVEN & TEUNISSEN, 1938, p. 9; ANDRÁSSY, 1979, p. 33-39; EBSARY, 1981, p. 111-112; SIDDIQI, 1986, p. 365-376.

SYNONYM. *Criconema* (*Variasquamata*) MEHTA & RASKI, 1971, p. 153.

Variasquamata (MEHTA & RASKI, 1971): KHAN, CHAWLA & SAHA, 1976, p. 94-96;

ANDRÁSSY, 1979, p. 111 (syn.).

DIAGNOSIS (amended). Family Criconematidae. *Female*: Body 0.24-0.7 mm; annules 54-94; ornamented with round, rect- or triangular scales arranged in eight to twenty-one longitudinal-rows; and outline conspicuously drawn out posteriorly. Head annules two; differentiated from body ones; subequal in diameter, or first one slightly smaller or larger than the second; first annule smooth, or crenate, rarely spined or fringed. Lip region elevated; labial disk rectangular, prominent; pseudolips six; median lobes semicircular, moderately developed; and submedian lobes round and small, in some species rudimentary or apparently outgrowths of the labial disk. Stylet 45-116 μm long, flexible or stout, knobs anchor-shaped. Vulva closed; the anterior lip rectangular, more or less overhanging the posterior one; vagina straight or sigmoid. Tail three to thirteen annules, conical to elongate conical; terminus round, bluntly pointed or pointed, in some species terminal annules drawn out and spike-like. *Male*: Lateral incisures three; bursa small or absent; spicules 28-42.7 μm long; gubernaculum simple, rod shape, quarter to one-fifth of the spicule length. *Juvenile* (*fourth and third stage*): Body with eight to sixteen longitudinal rows of scales. The scales on the posterior margins of the round annules, with reflactive tip elements. Male juvenile with stylet. *Juvenile* (*second stage*): Body annules crenate, with continuous nipple-like projections, or small scattered scales.

TYPE SPECIES. *Ogma murrayi* SOUTHERN, 1914

REMARKS. Genus *Ogma* includes 18 nominal species (see the key to spp.) in the world. Recently SIDDIQI (1986) proposed the following seven subgenera in this genus: *Ogma* (s.str); *Bladicephalanema* MEHTA & RASKI, 1971; *Pateracephalanema* MEHTA & RASKI, 1971; *Pellipecten* SIDDIQI, 1986; *Croserinema* KHAN, CHAWLA & SAHA, 1976; *Seriespinula* MEHTA & RASKI, 1971; and *Homogma* SIDDIQI, 1986. The validity of his subgenera, however, are doubtful by the reasons mentioned below.

Bladicephalanema includes two species from Australia. These species have single head annules, smooth edged face views, and bodies covered with tight scales triangular-shaped (MEHTA & RASKI, 1971; SIDDIQI, 1986). These features far from *Ogma* as mentioned in its description, and this is considered to be a different genus from *Ogma*.

Pateracephalanema (3 spp.) and *Pellipecten* (1 sp.) are also indigenous in the Australian region like the former genus. They have lobed first-head-annules, and round tails (COLBRAN, 1962, 1963, 1965; MEHTA & RASKI, 1971; ANDRÁSSY, 1979; SIDDIQI, 1986), but *Ogma* spp. have discoid head annules and rather pointed tail ends. Those two subgenera are closely related each other, may be subgenera of a same genus or a single genus, but they are not the member of *Ogma*.

Croserinema (1 sp.) has alternative rows of scales, lobed head annule, and round tail (SIDDIQI & SOUTHEY, 1962; KHAN, CHAWLA & SAHA, 1976; SIDDIQI, 1986). Those characters come close relations to *Crossonema* (s.str.), but not to *Ogma* (s.l.). *Croserinema* and *Crossonema* (s.str.) are considered to be synonymies as treated by EBSARY (1981).

Main characters of *Seriespinula* (9 spp.) are lobed first head annule, longitudinal scale rows, and pointed tail end (MEHTA & RASKI, 1971; ANDRÁSSY, 1979; SIDDIQI, 1986). Although this genus has longitudinal scale rows, in other aspects it is closely related to the *Neocrossonema* and allies by their structure of the labial region, head annules, tails, and juvenile scales. SKWIERCZ (1982) discussed the relation between *Ogma* and *Seriespinula*, and he concluded that they have not significant differences to distinguish, but, *O. murrayi*, the type of the genus, he described and illustrated was seem to be a species of *Seriespinula* itself (= *S. hungaricum*?). The status of *Seriespinula* will be discussed in detail in the next part of this series.

SIDDIQI (1986) gathered seven species in the subgenus *Homogma* from several genera of subfamily Criconematinae, but apparently this subgenus is heterogeneous. *O.* (*H.*) *taylata* (KHAN, CHAWLA & SAHA, 1976), the type species, and *O.* (*H.*) *taylori* (JAIRAJPURI, 1964) are included in *Crossonema* (s.str.) as pointed out by EBSARY (1981). *O.* (*H.*) *chrisbarnardi* (HEYNS, 1970) and *O.* (*H.*) *coronata* SCHUURMANS STEKHOVEN & TEUNISSEN, 1938 are transferred to *Syro* (ORTON WILLIAMS, 1985). *O.* (*H.*) *serrata* (KHAN & SIDDIQI, 1963) and *O.* (*H.*) *insulica* (CHOI & GERAERT, 1975) are moved to *Paralobocriconema*, and *O.* (*H.*) *querci* (CHOI & GERAERT, 1975) to *Macrocriconema* in the first part of this study (MINAGAWA, 1986). Hence *Homogma* n.syn. is made a junior synonym of *Crossonema* (s.str.).

The genus *Pseudocriconema* MINAGAWA, 1986 was erected for the single Japanese species, but treated as a junior synonym of *Ogma* by SIDDIQI (1986). This genus have unique features between *Ogma* and *Seriespinula* and its allies, and this is considered to be different from thoes genera. Details are discussed in the remarks of *Pseudocriconema* in this paper.

Key to the world species of *Ogma* is as follows (based on female adult; (* recorded in Japan).

1 . Twenty one longitudinal rows of scales ………………………………………………… *O. terrestris* RASKI & VALENZUELA, 1986

— Eighteen longitudinal rows of scales ………………………………………………… *O. duodevigintilineatum* (ANDRÁSSY, 1968) ANDRÁSSY, 1979

— Twelve longitudinal rows of scales……………………………………………………2

— Eight or ten longitudinal rows of scales in most females, rarely twelve rows …………4

2 . Body annules 58-60; vulva on 13th annule from the posterior terminus………………… *O. danubiale* ANDRÁSSY, 1985

— Body annules 66-71; vulva on 8th to 10th annule from the posterior terminus …………3

3 . Body length 0.39 mm; stylet about 90 μm ……………………*O. zernovi* KIRJANOVA, 1948

— Body length 0.63-0.7 mm; stylet 102-106 μm ………………………………………… *O. squamiferum* (HEYNS, 1970) ANDRÁSSY, 1979

4 . First head annule with fringes or spines on outer margin ……………………………5

— First head annule smooth or crenate, but without fringes or spines………………………6

5 . First head annule with 25-30 long fringes on outer margin …………………………… *O. castellanum* ANDRÁSSY, 1985

— First head annule with short spines …………………………*O. murrayi* SOUTHERN, 1914

6 . Ten longitudinal rows of scales in most females, rarely 8 or 12 ……………………7

— Eight longitudinal rows of scales in most females, rarely 10 …………………………14

7 . Body annules more than 70 ……………………………………………………………8

— Body annules less than 70 ……………………………………………………………11

8 . First head annule distinctly smaller than the second in diameter; vulva at 19th annule

from the terminus ·································· *O. spinosum* ANDRÁSSY, 1979

— First head annule equal to the second, vulva at 11th to 17th annule from terminus ···9

9. Body 0.57 mm; stylet 93-116 μm ·································· *O. rhombosquamatum* (MEHTA & RASKI, 1971) ANDRÁSSY, 1979

— Body 0.27-0.54 mm; stylet 46.3-90.7 μm ·································· 10

10. Tail terminus pointed; diameter of first head annules equal to the second ·································· *O. coffeae* (EDWARD, MISRA & RAI, 1970) ANDRÁSSY, 1979 *

— Tail terminus bluntly rounded, first head annule smaller than the first ·································· *O. decalineatum* (CHITWOOD, 1957) ANDRÁSSY, 1979 *

11. First head annule smaller than the second ·································· *O. tokobaevi* (GRITSENKO, 1979) SIDDIQI, 1986

— First head annule larger than the second ·································· 12

12. Stylet 68 μm ·································· *O. simlaense* (JAIRAJPURI, 1963) ANDRÁSSY, 1979

— Stylet shorter than 60 μm ·································· 13

13. Body 0.27-0.3 mm; annules 60-63; stylet 55-60 μm ·································· *O. fotedari* (MAHAJAN & BIJRAL, 1973) ANDRÁSSY, 1979

— Body 0.34-0.46 mm; annules 54-59; stylet 44.5-50.7 μm ············ *O. trigonolepidum* n.sp. *

14. Stylet 82 μm, first head annule smaller than the second ·································· *O. lentiforme* SCHUURMANS STEKHOVEN & TEUNISSEN, 1938

— Stylet 45.3-69 μm, first head annule equal to or slightly smaller or larger than the second ·································· 15

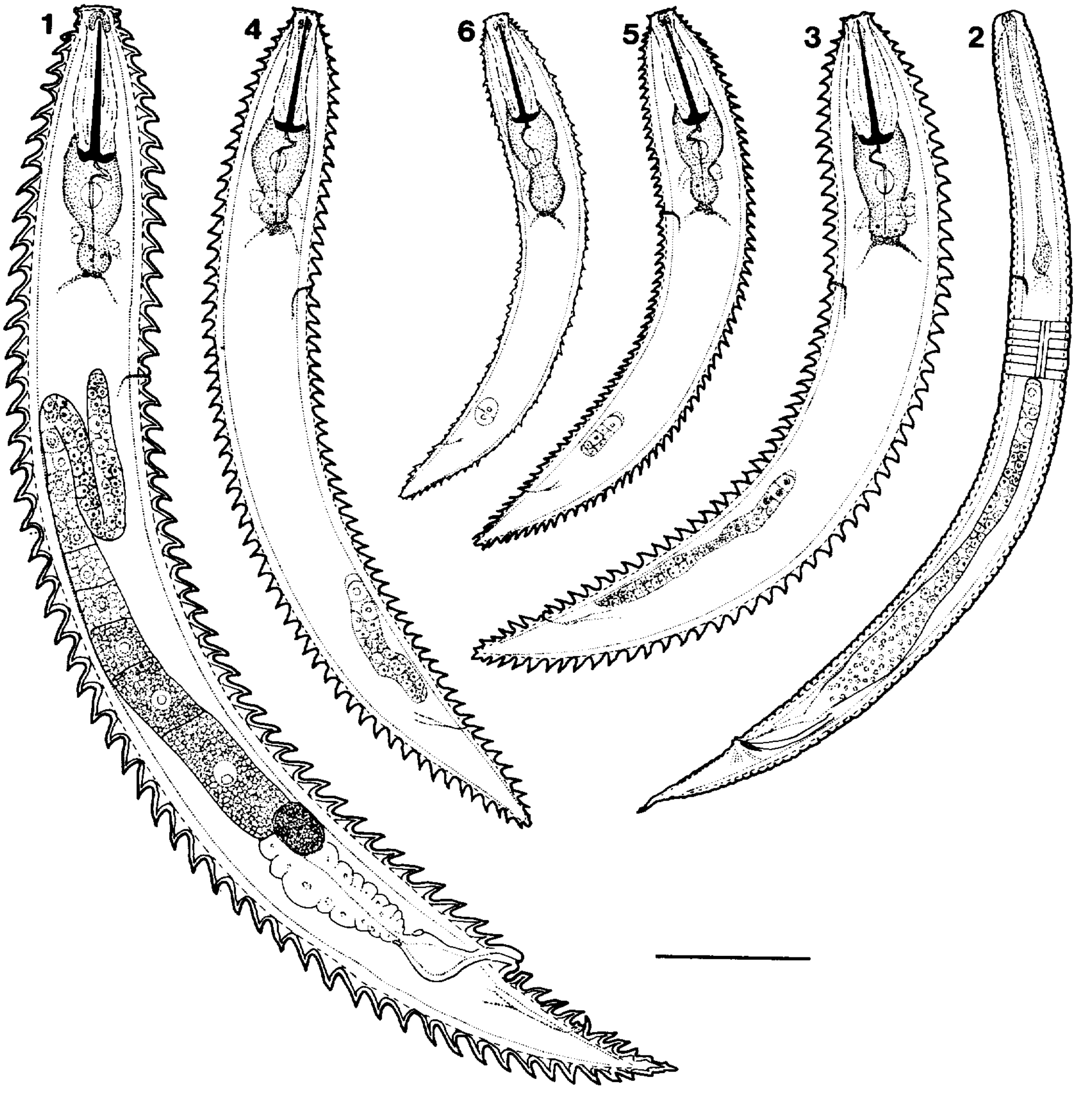
15. First head annule slightly smaller than the second ·································· *O. octangular* (COBB, 1914) SCHUURMANS STEKHOVEN & TEUNISSEN, 1938

— First head annule equal to or slightly larger than the second ·································· *O. brevistylum* TOIDA, 1983 *

OGMA TRIGONOLEPIDUM N.SP.

(Figs. 1-6, 42, 48, 51, 57, 58, 65, 66, 77, 83, 89, 90, 113-115,
125, 131, 137, 140, 146, 152; Tables 1, 2, 13)

DESCRIPTIONS (mainly based on the population of Mt. Aso, Kumamoto). *Female adult* (Figs. 1, 42, 65, 66, 77, 83, 89, 90; Table 1): Body stout, covered with thick cuticle, curved on ventral side after relaxed by gentle heat; gradually narrowing to truncate head end in anterior part; posterior body regularly tapering in pointed tail terminus. Head two annules, not retrorse, set off from the body; first one discoid, slightly oval, outer margin occasionally crinkled but not crenate; second collar like, smaller than the first. In face view, labial disk rectangular with lateral projections on each corner, submedian lobes and lateral lobes poorly developed according to SEM observation. Body annules not retrorse, and bear triangular to round scales; seven in number on the first body annule, eight on the second, nine on the third, ten per annule on the fourth to the preceding annule of vulva, and decreasing in numbers as eight to six on the postvulval part of body to the terminus. Stylet robust, not flexible; knobs anchor-shaped.



Figs. 1-6. *Ogma trigonolepidum* n. sp.:1. Female adult; 2. Male adult; 3. Fourth-stage juvenile, female; 4. *Do.*, male; 5. Third-stage juvenile; 6. Second-stage juvenile. Scale bar indicates 50 μm.

Esophagus with short and broad isthmus; enclosed at 80.0-92.7 μm (86.2±3.8μm: mean ± standard deviation n=25) from lip. Excretory pore located at 16th to 19th annule, 104-133 μm (120±6.5) from the anterior end of body, the tip of that spine flattened. Vulva at 11th to 13th annule, 49.5-70.7 μm (62.2±5.8) from posterior end, anterior vulval lip rectangular with blunt protuberances on each side of front edge, strongly overhanging to the posterior one, which semicircular shaped. Vagina sigmoid. Ovary outstretched, and occasionally reflexed twice; the first directed to posteriorly and the second to anteriorly, the tip reaching to the esophagus base. Spermatheca oval or spherical, filled with round spermatozoa. Anus three to five annules posterior to vulva; the body scale immediately posterior to anus directed anteriorly. Tail conical, 23.1-39.3 μm (32.6±4.1) in length, terminal annules drawn out.

Male adult (Figs. 2, 48, 113-115; Table 13): Body cylindrical, tapering gradually to posterior quartar of body. Annules 2.9-4.3 μm (3.2 μm: mean, n=10) apart around midbody. Head flattened in profile. Labial disk round by SEM observation. Lateral parts of face slightly swollen. Esophagus degenerate, obscure, slender, 70.1-112 μm (90.0) long, metacorpus weakly swollen but bulb not developed and not muscular. Excretory pore around the level of esophagus end. Hemizonid at two or three annules anterior to excretory pore. Spicules setaceous, arched, 32.3-38.0 μm (34.8) long. Gubernaculum small, simple crescent, 8.0-8.8 μm (8.4) long. Testis single outstretched, 93.3-148 μm (121.3) in length; spermatozoa round. Lateral field originated at just behind the head, 3.3-4.4 μm wide at midbody, widened around cloaca, with three incisures, inner line fused with dorsal one around the level of cloaca. Tail elongated conical, with pointed terminus, 33.3-44.0 μm (39.0) in length. Bursa degenerate.

Fourth-stage juvenile, female (Figs. 3, 51, 125, 131, 146; Table 2): Body curved on ventral side after fixation by gentle heat, stout, cylindrical, widest at esophagus region, gradually narrowing to truncate head in anterior part, and to bluntly pointed tail terminus in posterior end. Body scale triangular to rectangular, arranged in ten to twelve longitudinal rows at midbody; tip of each scale bearing minute spines, about 1 μm long, five to seven in number on each front edge. Head annules two; first one crenate, with 30 to 40 small spines on outer margin, 11.5-12.3 μm (11.7 μm; mean, n=10) diameter; second bigger than the first, 13.2-15.6 μm (14.2) diameter, crinkly and spined (*ca.* 30 spines); face view similar to that of female but lateral projections of labial disk more round shaped, and semicircular labial plate more developed. Stylet robust, knobs anchor shaped. Tail conical, terminus pointed. Genital primordium long.

Fourth-stage juvenile, male (Fig. 4; Table 2): General shape similar to the female fourth-stage juvenile, but more slender body, lesser number (9-10) of scale rows, and shorter and stouter genital primordium compared with the latter.

Third-stage juvenile (Figs. 5, 57; Table 2): Similar to female fourth-stage juvenile, but body smaller; and genital primordium long oval. Sexual differences not observed.

Second-stage juvenile (Figs. 6, 58, 137, 140, 152; Table 2): Body stout. Body scales triangular or rectangular, 12 to 14 per annule around midbody, arranged in irregular alternative rows. First head annule smooth, 9.0-9.3 μm (9.1 μm; mean, n=3); second annule saucer shaped. Genital primordium oval, 8.0-8.7 μm (8.2) long, 7.3-7.7 μm (7.4) wide, with two cells. Tail conical, 15.7-21.8 μm (18.9) long, terminus bluntly pointed.

TYPE SPECIMENS. Holotype female is deposited in the Herbarium and Insect Museum of the National Institute of Agro-Environmental Sciences (NIAES) in Tsukuba, Ibaraki. Pratypes: 150 females, 20 males and 50 juveniles. Paratypes of 10 females will be distributed to the following each institute: USDA Nematode Collection, Beltsville, Maryland, USA; University of California, Nematode Survey Collection, Davis, California, USA; Nematology Department, Rothamsted Experimental Station, Harpenden, Herts, England; Commonwealth Institute of Parasitology, St. Albans, Herts, England; Department of Nematology, Agricultural University, Wageningen, The Netherlands; Instituut voor Dierkunde, Rijksuniversiteit Gent, Gent, Belgium; and Laboratoire des Vers, Muséum National d'Histoire Naturelle, Paris, France. The remaining paratypes are on deposit in NIAES.

TYPE LOCALITY AND HABITAT. Holotype and paratype specimens were collected from soil around root of *Quercus serrata* THUNB. at the somma of Mt. Aso (860 m alt.) in Nishi-yunoura, Aso-machi, Kumamoto (N. MINAGAWA leg.) on September 2, 1980, and some paratypes were also obtained from soil around roots of *Junglans mandshurica* MAXIM. var *Sieboldiana* MAKINO, *Morus australis* POIRET, *Prunus yedoensis* MATSUM., *Styrax japonica* SIEB. & ZUCC. and *Callicarpa japonica* THUNB. in Mt. Akagi (500 m alt.), Kogure, Fujimi-mura, Gunma (N. MINAGAWA leg.) on October 27, 1981.

DIAGNOSIS AND RELATIONSHIPS. *Ogma trigonolepidum* n.sp. is characterized with the stout body, triangular body scales which arranged in ten longitudinal rows around midbody, the short stylet (44.5-50.7 μm), smaller number of body annules (R=54-59), strongly overhanging anterior-vulval-lip, and slightly oval shaped and smooth margin of the first head annule.

This new species is seem to be similar to *O. simlaense* (JAIRAJPURI, 1963) and *O. fotedari* (MAHAJAN & BIJRAL, 1973) by their number of scale rows and short stylets, but it can be distinguished from the former by the shorter stylet (44.5-50.7 μm *vs.* 67-72 μm), and from the latter by the larger body (363-457 μm *vs.* 270-300 μm), truncate head end (slightly convex in *O. fotedari*), and subequal diameter of the first and second head annules (first annule distinctly larger than the second in the latter). This species also differs from *O. coffeae* (EDWARD, MISRA & RAI, 1970), *O. decalineatum* (CHITWOOD, 1957), *O. rhombosquamatum* (MEHTA & RASKI, 1971), which having ten longitudinal rows of scales, in the smooth margin of the first head annule of female, and from *O. spinosum* ANDRÁSSY, 1979 in the lesser number of body annules (R=54-59 *vs.* R=69-88).

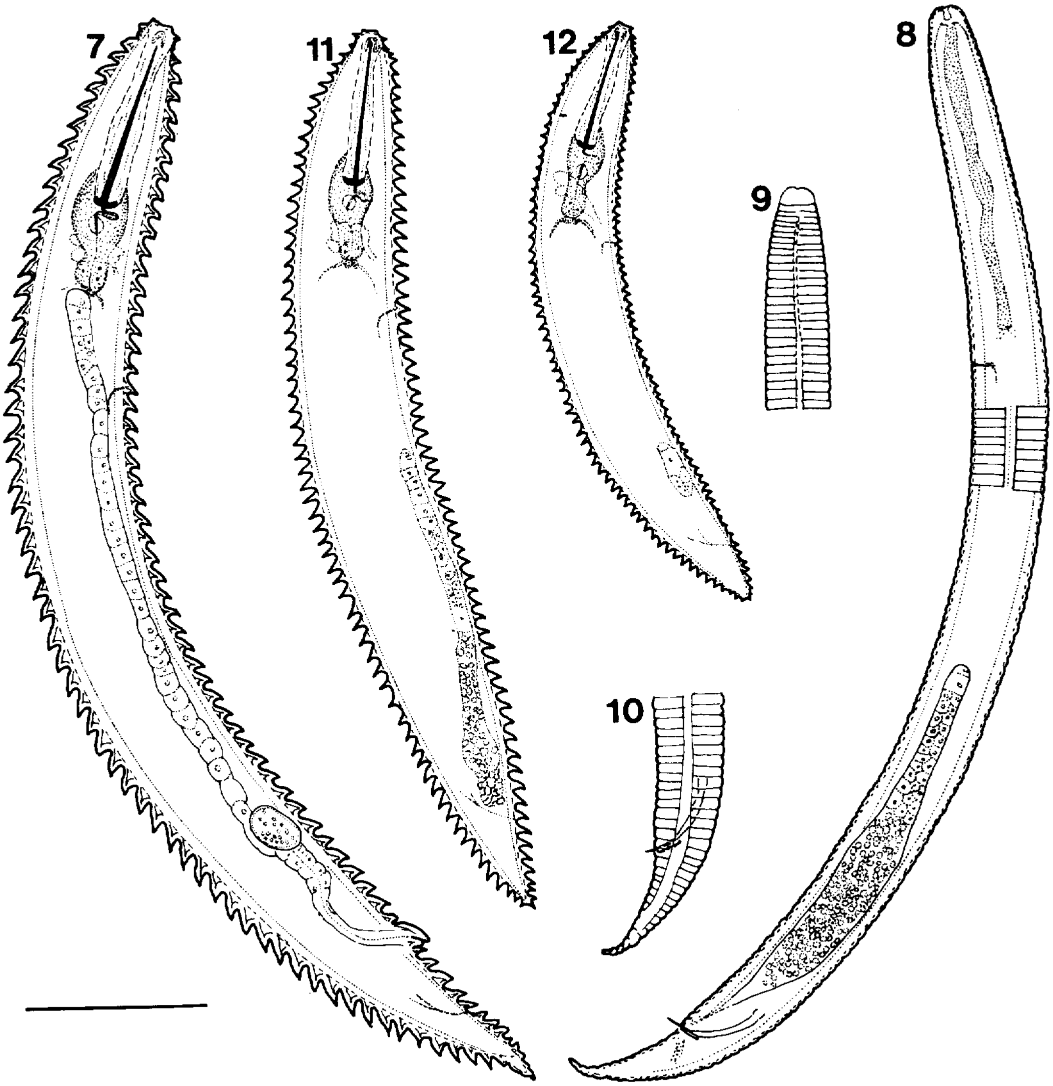
Female face view and body scales of the second-stage juvenile are diverse form of other Japanese species of *Ogma*. The triangular body scales of female adult are also different type of others, and resemble to those of *O. murrayi* SOUTHERN, 1914.

OGMA BREVISTYLUM TOIDA, 1983

(Figs. 7-12, 43, 52, 67, 78, 84, 91, 126, 132, 147; Tables 3, 4, 13)

TOIDA, 1983, p. 17-18, Fig. 2A-I (*Ogma*).

DESCRIPTIONS (mainly based on the population from Misugi, Mie). *Female adult* (Figs. 7, 43, 67, 78, 84, 91; Table 3): Body curved ventrally after killing by gentle heat; cylindrical, gradually



Figs. 7-12. *Ogma brevistylum* Toida, 1983: 7. Female adult; 8. Male adult, gerneral view; 9. *Do.*, anterior body; 10. *Do.*, posterior body; 11. Fourth-stage juvenile, female; 12. Third-stage juvenile. Scale bar indicats 50 μm.

narrowing to head end in anterior region and regularly tapering to tail terminus in postvulval part of body. Body scales semicircular to rectangular, seven scales on the first body annule, eight on the second to preceding annule of vulva, which arranged in longitudinal rows, decreasing the number from vulva to tail terminus. Head annules two, usually first annule slightly larger than the second or subequal diameter, occasionally equal diameter (17 of 60 females examined), or rarely first one smaller than the second (one female); first annule discoid, smooth and seldom crinkled, notched in ventral portion of outer margin; second one smooth. By SEM observation labial disc rectangular, rimed around the narrow margin, submedian lobes distinct and round; lateral lobes semicircular. Stylet thin, flexible; knobs flattened in anterior surface or with small forwardly directing projections. Excretory pore at two to six annules posterior to the level of esophagus end. Ovary outstretched or reflexed twice, the tip reaching the esophagus end; spermatheca spherical, filled with round spermatozoa; vagina slight sigmoid. Vulva at 11 to 15 annules, 43.3-57.3 μm (49.8±3.7 μm; mean ±standard deviation, n=20) from the terminus; anterior vulval lip rectangular with two blunt projections on both sides of front edge, overhanging round posterior one. Tail elongated conical, 18.0-36.0 μm (27.3±3.5) long, terminal few annules drawn out. Scales of postvulval part triangular, longer than the midbody ones, but no scales in posterior extremity of body.

Male adult (from Mt. Hamaishi, Shizuoka; Figs. 8-10; Table 13); Single specimens available for study. Body cylindrical, slender, curved ventrally after treatment by gentle heat. Head subspherical, without annulations, depressed in middle of front in profile. Esophagus slender, degenerate. Excretory pore at 29.1 μm from lip; excretory duct directed laterally at beginning. Lateral field originated from the fourth body annule, inconspicuous in anterior part; with three incisures, inner one obscure; 3.3 μm wide around midbody, widened around cloaca. Body annules flat, 2.9 μm apart at midbody. Testis outstretched; spermatozoa round. Cloacal prominence small; without distinct bursa. Tail conical, terminus roundly pointed.

Fourth-stage juvenile, female (Figs. 11, 52, 126, 132, 147; Table 4): Body spindle shaped, narrowing to truncate head end in anterior body, and to pointed tail terminus in posterior end. Body scale round to triangular, front edge smooth, arranged in ten to twelve longitudinal rows. Spines of scale edge present in tail region, but very minute, less than 1-μm long. Head annules two; first one discoid, 8.3-10.7 μm (9.7 μm; mean, n=5) diameter, with minute spines on outer margin; second one larger than the first, 10.7-12.7 μm (11.5) across, crenate. Labial disk convex. Stylet thin; knobs small and round. Tail conical, 18.0-28.0 μm (23.2) long, terminus pointed. Genital primordium long.

Third-stage juvenile (Fig. 12; Table 4): Similar to the fourth-stage juvenile, but body shorter and stouter, and genital primordium elongate oval.

Second-stage juvenile: Not found.

SPECIMENS EXAMINED. Twenty females and juveniles: Hirakura (Mie University Forest), Misugi, Mie (N. MINAGAWA and T. MIZUKUBO leg.) from the rhizosphere of *Larix leptolepis* (SIEB. & ZUCC.) GORDON on October 10, 1983; 20 females, 1 male and juveniles: Mt. Hamaishi, Yui, Shizuoka (N. MINAGAWA leg.) from *Buxus microphylla* SIEB. & ZUCC. var. *japonica* (MUELL. ARQ.) REHD. & WILS. on March 4, 1987; 10 females (paratype specimens): Nebukawa, Kanagawa (Y.

TOIDA leg.) from *Morus australis* POIRET.

REMARKS. The measurements are presented in Table 3-4 and 13, which show that the morphology of three populations corresponding with each other. Male adult and juvenile stages are first described at the present time. Some differences present between the original descriptions and the present observations of paratypes, such as body length and presence of spermatheca, however, other respects are identical with them (Table 3).

The principle characters to distinguish this species from the others of this genus are smaller body, short stylet, almost equal sized head annules, and eight longitudinal rows of scales. *O. brevistylum* is most closely related to *O. lentiforme* SCHUURMANS STEKHOVEN & TEUNISSEN, 1938 according to the number of body annules, and location of vulva and anus from the posterior terminus as pointed out by TOIDA (1983), and this can be separated from it by the shorter body (239-403 μm), and larger or almost equal diameter of the first head annule compared with the second one (0.39-0.49 mm body length, and first annule smaller than the second in *O. lentiforne*). This species also comes close to *O. octangulare* (COBB, 1914), but it can be distinguished from the latter by the slightly larger first-head-annule comparing to the second one (slightly smaller in *O. octangulare*).

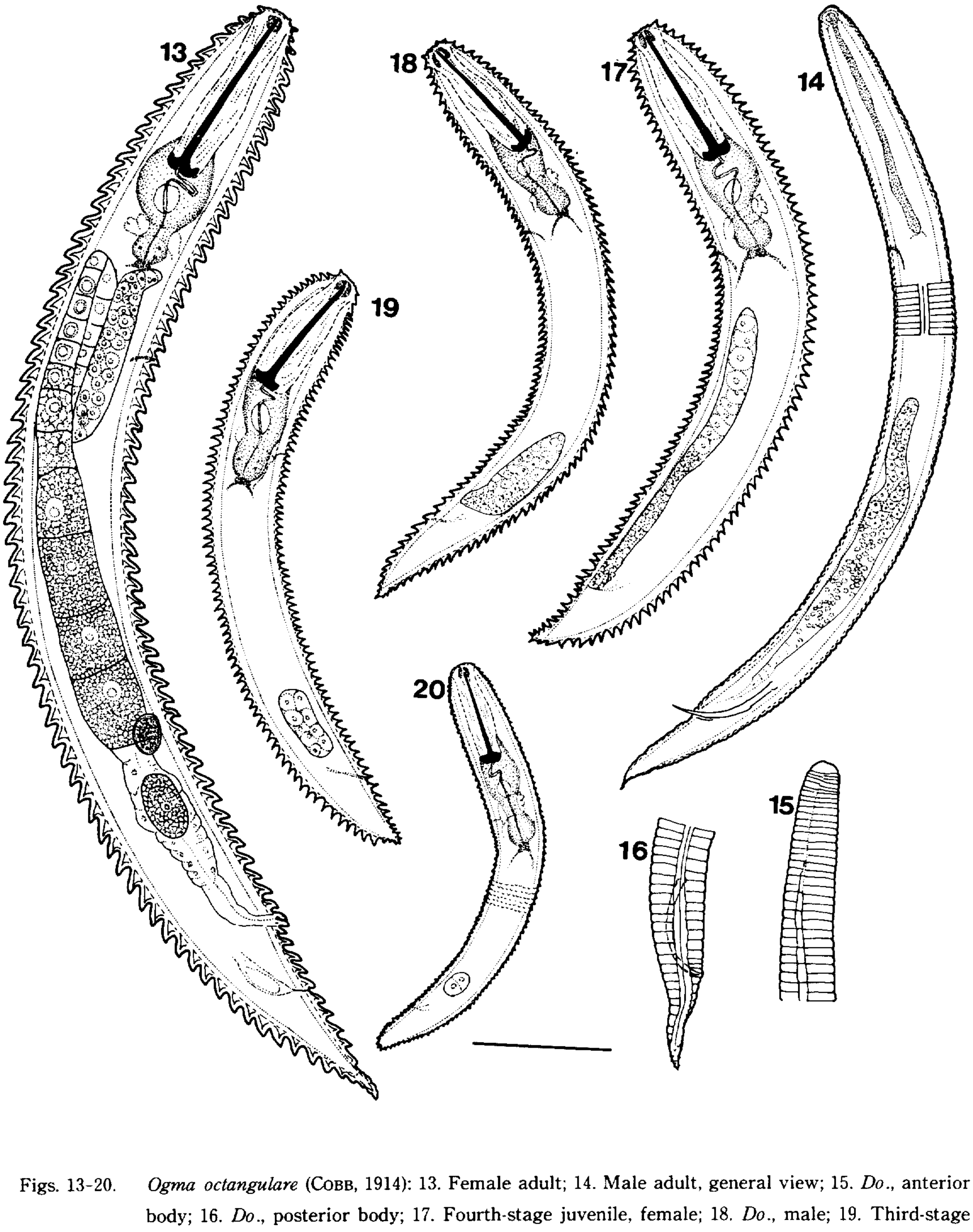
OGMA OCTANGULARE (COBB, 1914) SCHUURMANS STEKHOVEN & TEUNISSEN, 1938

(Figs. 13-20, 44, 53, 68-70, 79, 85, 92-94, 116-118, 127, 133,
138, 141, 148, 153; Tables 5, 6, 13)

COBB, 1914, p. 74, Fig. 1 (*Iota*); MENZEL, 1917, p. 157-161 (*Hoplolaimus*); MICOLETZKY, 1922, p. 580 (*Hoplolaimus*); MICOLETZKY, 1925, p. 269 (*Iota*); TAYLOR, 1936, p. 404-406, Fig. 50 (*Criconema*); SCHUURMANS STEKHOVEN & TEUNISSEN, 1938, p. 9 (*Ogma*); DE CONINK, 1945, p. 28 (*Criconema*); CHITWOOD, 1957, p. 61 (*Criconema*); THORNE, 1961, p. 338-339, Fig. 13-1 (*Criconema*); SIDDIQI, 1961, p. 24 (*Criconema*); HOPPER, 1963, p. 595-597, figs. 5-7 (*Criconema*); MEHTA & RASKI, 1971, p. 153-155, Fig. 1 G-O (*Criconema* (*Variasquamata*)); KHAN, CHAWLA & SAHA, 1976, p. 96 (*Variasquamata*); KNOBLOCH, 1978, p. 245-249, Fig. 1-2 (*Criconema*); ANDRÁSSY, 1979, p. 35 (*Ogma*); EBSARY, 1981, p. 113, Fig. 6 A-E (*Ogma*); VAN DEN BERG, 1983, p. 152-154, Figs. 21-27 (*Ogma*).

SYNONYM. *Criconema punici* EDWARD, MISRA, PETER & RAI, 1971, p. 59-62, Fig. 1 A-F; MAHAJAN & BIJRAL, 1973, p. 202-203, pl. 2, Figs. D-E (*Crossonema*); KHAN, CHAWLA & SAHA, 1976, p. 93 (*Seriespinula*); ANDRÁSSY, 1979, p. 35 (syn.).

DESCRIPTIONS (mainly based on the population from Nopporo, Hokkaido). *Female adult* (Figs. 13, 44, 68-70, 79, 85, 92-94; Table 5): Body stout, cylindrical and tapering to the truncate head in the anterior end and to the conical tail in the posterior terminus. Body scales round, arranged in longitudinal rows, ten in number from the first body annule to the vulva, decreasing in postvulval annules seven to four towards the terminus. Head annules two; first one saucer shape or crinkled (Tomuraushi population), outer margin smooth or with some minute crenations; and sometimes with distinct notch in the ventral portion; second larger than the first, smooth or with small knobs on the outer margin. In face view, labial disk rectangular, marginated by shallow edge in the dorsal and the ventral portions, both their extremities



Figs. 13-20. *Ogma octangulare* (Cobb, 1914): 13. Female adult; 14. Male adult, general view; 15. *Do.*, anterior body; 16. *Do.*, posterior body; 17. Fourth-stage juvenile, female; 18. *Do.*, male; 19. Third-stage juvenile; 20. Second-stage juvenile. Scale bar indicates 50 μm.

swollen and directed forwardly; lateral lobes semicircular; submedian lobes small and round by SEM observation. Stylet stout not flexible, knobs anchor shape. Excretory pore on the few annules posterior to the esophagus terminus. Vulva slit like, opened between the vulval lips, located on the twelfth to fifteenth annule from the posterior end. Anterior vulval lip small, not overhanging the posterior one, with minute and roundly pointed extensions on the both sides of front edge; posterior one round and simple. Ovary outstretched or reflexed twice, reaching the esophagus end; spermatheca spherical with round spermatozoa. Tail conical, terminus roundly pointed.

Male adult (Figs. 14-16, 116-118; Table 13): Body cylindrical, curved ventral or open C-shaped after gentle heat treatment. Head subspherical, lip region round and not truncate, with three annules but obscure. Esophagus degenerate. Excretory pore located around the level of esophagus end, excretory duct directed laterally and posteriorly. Hemizonid one-annule long, two or three annules anterior to the excretory pore. Body annules distinct and flat, 2.4-2.6 μm apart around midbody. Lateral field originated from third body annule, 3.7-5.0 μm wide in midbody, with three incisures, widened in the posterior to the cloaca as a small bursa. Cloacal prominence absent. Spicules arch-shaped, gubernaculum rod-like. Testis single, outstretched; spermatozoa round. Tail elongate conoid, terminal one-third slightly plump and with small spine-like projections on the surface, rest part smooth, regularly narrowing to the end.

Fourth-stage juvenile, female (Figs. 17, 53, 127, 133, 148; Table 6): Body stout, spindle shaped, narrowing to the truncate head in the anterior half of esophageal region, and regularly decreasing the width to the tail end in the posterior one-third of body. Body scales round, with two to six minute spines on each posterior edge; arranged in longitudinal rows, 12 to 15 in number at esophageal region. Head annules two, differentiated from body ones; first one discoid, 12.0-13.0 μm (12.8 μm: mean, n=3), smooth in outer margin; second one larger than the first (16.0-17.0 μm in diameter), smooth. Stylet short and stout, knobs anchor-shaped, strong. Excretory pore around the slightly posterior to the esophagus end. Tail conical, narrowing to the terminus, scales longer than those of body. Genital primordium long.

Fourth-stage juveniles, male (Fig. 18; Table 6): Similar to the female fourth-stage juvenile, but body slightly slender, tail region elongate conical, spine on body scales absent in fore and midbody region, and genital primordium elongate oval.

Third-stage juvenile (Fig. 19; Table 6): General shape similar to the fourth-stage juvenile, but body smaller, stylet shorter, and genital primordium oval.

Second-stage juvenile (Fig. 20, 138, 141, 153; Table 6): Body small, cylindrical in anterior half, and gradually narrowing to the tail end in the posterior half of the body. Body scales small, round, continuous on the posterior edges of annules in anterior body; in the midbody region posterior edge of annules crinkled continuously. Tail 17.7-19.0 μm (18.4 μm: mean, n=4), terminus round.

SPECIMENS EXAMINED. Eleven females, and two males: Shiobara, Tochigi Prefecture in July, 1982 (N. MINAGAWA leg.) from rhizosphere of *Orixa japonica* THUNB.; 4 females and one juvenile: Karuizawa, Nagano on October 14, 1985 (N. MINAGAWA and T. MIZUKUBO leg.) from *Fagus* *crenata* BLUME; 25 females, one male and 10 juveniles: Nopporo, Sapporo, Hokkaido on June 24, 1986 (N. MINAGAWA leg.) from *Kalopanx pictus* (THUNB.) NAKAI and *Alnus hirsuta* TURCZ.; 25 females, three males, and juveniles: Tomuraushi, Hokkaido on June 24, 1986 (T. MIZUKUBO leg.) from the rhizosphere of woody plant (unidentified).

REMARKS. The principle characters of *O. octangulare* are as follows: stout body, eight longitudinal rows of scales, short and strong stylet, larger first head annule comparing to the second, not strongly drawn out terminal annules of tail. This species widely distributes in North America (MEHTA & RASKI, 1971), and is also reported from Austria, Germany, Poland, India, Ivory Coast, Guadelope, and South Africa (SIDDIQI, 1961; MEHTA & RASKI, 1971; ANDRÁSSY, 1979; VAN DEN BERG, 1983). Male adult was described from Canada (HOPPER, 1963) and United States (KNOBLOCH, 1978), and juveniles are from United States (KNOBLOCH, 1978) and South Africa (VAN DEN BERG, 1983).

The morphology and dimensions of intraspecific variations among three Japanese populations are small. They are overlapping each other in most characters, but the diameter of the first head annule almost equal or slightly smaller than that of the second in the Tomuraushi specimens instead of the distinctly smaller than the second in the others. The outer margins of the first head annules are crenate or smooth in Japanese specimens even in a single pupulation. MEHTA and RASKI (1971) also pointed out the same characteristics of the head morphology of American and European populations. Including these problems and also morphologies of male adult, fourth- and third-stage juveniles, Japanese specimens are well corresponding with the most aspects of those of the oversea populations. The measurements and dimensions of Japanese and non-Japanese populations are completely overlapped each other.

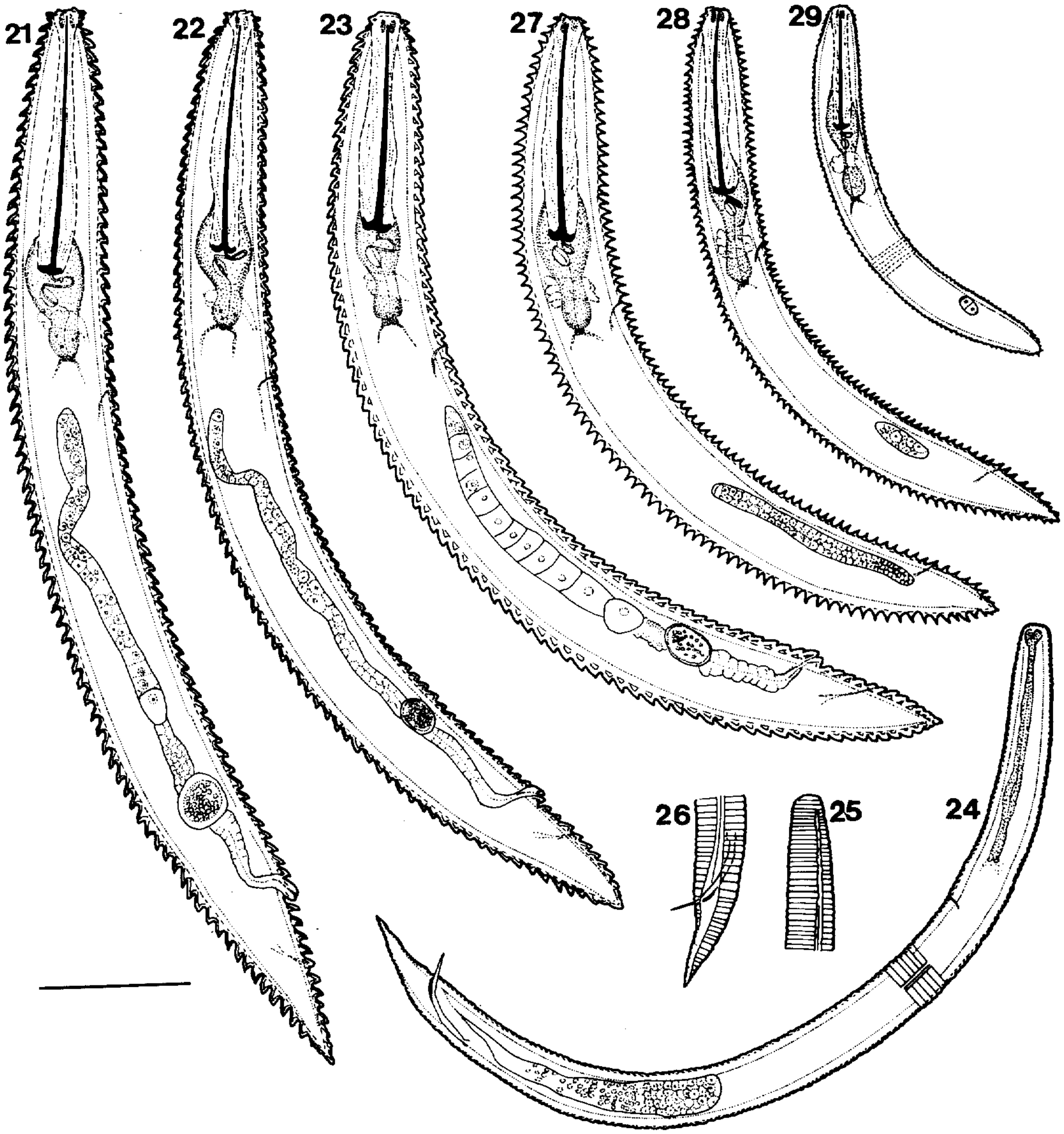
Although the second-stage juvenile of this species is illustrated having the similar body scales to those of the third- and fourth stages in the ontogenic study by KNOBLOCH (1978), so far as the present investigation is concerned, the body scale of this stage is small and round scales like crenation of body annules. The KNOBLOCH's illustration and measurements (especially comparison with the stylet length to these of the third and second stage) are seem to those of the young third-stage juvenile.

OGMA COFFEAE (EDWARD, MISRA & RAI, 1970) ANDRÁSSY, 1979
(Figs. 21-29, 45, 54, 59, 60, 71-74, 80, 81, 86, 87, 95-99,
128, 134, 139, 142, 149, 154; Tables 7, 8, 13)

EDWARD, MISRA & RAI, 1970, p. 13-15, fig. 1 A-F, photo (*Criconema*); ANDRÁSSY, 1979, p. 34 (*Ogma*); EBSARY, 1981, p. 111 (*Ogma*); VAN DEN BERG, 1983, p. 152, figs. 16-20 (*Ogma*).

SYNONYM. *Criconema* (*Variasquamata*) *gracile* MEHTA & RASKI, 1971, p. 158-160, fig. 2 G-P; KHAN, CHAWLA & SAHA, 1976, p. 96 (*Variasquamata*); TOIDA, OHSHIMA & HIRATA, 1978, p. 381-383, (*Criconema* (*Variasquamata*)); ANDRÁSSY, 1979, p. 34 (syn. of *O. decalineatum*); TOIDA & MOMOTA, 1981, p. 30-31, fig. 4 A-H (*Variasquamata*); EBSARY, 1981, p. 111 (syn.).

DESCRIPTIONS (mainly based on the population from Suginami, Tokyo). *Female adult* (Figs.



Figs 21-29. *Ogma coffeae* (EDWARD, MISRA & RAI, 1970): 21. Female adult (Mt. Aso, Kumamoto); 22. *Do*., (Suginami, Tokyo); 23. *Do*. (Kunigami, Okinawa); 24. Male adult (Kunigami, Okinawa), general view; 25. *Do*., anterior body; 26. *Do*., posterior body; 27. Fourth-stage juvenile, female; 28. Third-stage juvenile; 29. Second-stage juvenile. Scale bar indicates 50 μm.

21-23, 45, 71-74, 80, 81, 86, 87, 95-99; Table 7): Body curved ventrally after treatment by gentle heat, cylindrical, tapering to truncate head in anterior end and conical tail in posterior body. Body scales round, six in the first body annule, eight in the second, nine in third, ten in number from fourth to preceding annule to vulva, decreasing from eight to four towards the posterior terminus. In rare case the number of scale rows eight (single female from Mt. Aso, Kumamoto). Head annules two, mostly equal diameter, rarely first annule smaller than the second, outer margin crinkle (especially in Okinawa population) but smooth. Labial disk rectangular, margined by distinct rim; submedian lobes round and small; lateral lobes semicircular, well developed. Body with small and round scales arranged in ten longitudinal rows, decreasing in tail region. Stylet thin and flexible; knobs anchor shaped. Excretory pore at two to five annules posterior to esophagus end. Ovary outstretched, spermatheca spherical filled with round spermatozoa; vagina almost straight. Vulva at eleventh to fourteenth annule from terminus; anterior vulval lip small, rectangular, occasionally bears blunt projections in the both corner of the front edge, never overhanging round posterior one. Tail variable shaped, conical, elongate conical or round, with small scales; terminal few annules small, and without scales, ending nipple like or drawn out tip.

Male adult (from Kunigami, Okinawa: Figs. 24-26; Table 13): Although females of most populations have developed spermathecae filled with spermatozoa, only one male adult was available to study from Kunigami, Okinawa. Body open C-shape after treatment by gentle heat. Body annules distinct, 2.0 μm apart around midbody. Head roundly flattened. Esophagus slender, degenerate. Hemizonid at five annules anterior to excretory pore. Excretory pore at 17.8 μm posterior to esophagus end. Tail elongate conical, terminus pointed. Bursa not developed; cloacal prominence absent. Spicules arch-shaped; gubernaculum simple, rod like. Lateral field 3.3 μm wide, with three incisures, widened around cloaca. Testis single, outstretched.

Fourth-stage juvenile, female (Figs. 27, 54, 128, 134, 149; Table 8): Body stout, gradually narrowing to head end in anterior body and to conical tail in posterior. Body scales round to rectangular with minute spines on each front edge, arranged in 12 to 13 longitudinal rows. First head annule slightly crenated or smooth; labial disk rectangular, lateral lobes semicircular; submedian lobes round. Stylet flexible, knobs anchor shaped. Excretory pore near the level of esophagus end. Tail conical to round conical, terminus bluntly pointed. Genital primordium long.

Third-stage juvenile (Figs. 28, 59; Table 8): General shape similar to the fourth stage, but body smaller, stylet shorter, scale rows greater number (11-16), and genital primordium less developed, elongate oval, than those of that stage.

Second-stage juvenile (Figs. 29, 60, 139, 142, 154; Table 8): Body small; scales minute and continuous in anterior body, and triangular and pointed tips and arranged in scattere in mid- and posterior body. Tail conical, bluntly pointed terminus. Genital primordium oval, with two cells.

SPECIMENS EXAMINED. Twenty-five females and one male: Yona (Experimental Forest of University of the Ryukyus), Kunigami, Okinawa on March 10, 1986 (N. MINAGAWA leg.) from the rhizosphere of *Neolitsea sericea* (BL.) KOIDZ., *Litsea acuminata* (BL.) KURATA, *Morus australis* POIRET, *Quercus acuta* THUNB. and *Podocarpus macrophyllus* (THUNB.) D. DON.; one female: Mt. Aso (860 m alt.), Nishi-yunoura, Aso-machi, Kumamoto on June 5, 1980 (N. MINAGAWA leg.) from *Acer* sp.; females and juveniles: Suginami (Sericultural Experiment Station), Tokyo (reared in Tsukuba by Y. TOIDA) from *Morus australis* in October, 1986; females: Yabutsuka-honcho, Gunma on October 27, 1981 (N. MINAGAWA leg.) from *M. australis*; females: Toyono, Nagano in 1970 from *M. australis*.

REMARKS. *O. coffeae* commonly occurs in mulberry fields from Kyushu to Tohoku district in Japan (TOIDA, 1984), and in the rhizosphere of forest trees in Okinawa. In India, coffee is reported as the type host of this species (EDWARD *et al.*, 1970; MEHTA & RASKI, 1971), and VAN DEN BERG (1983) detected it from forest soil in South Africa.

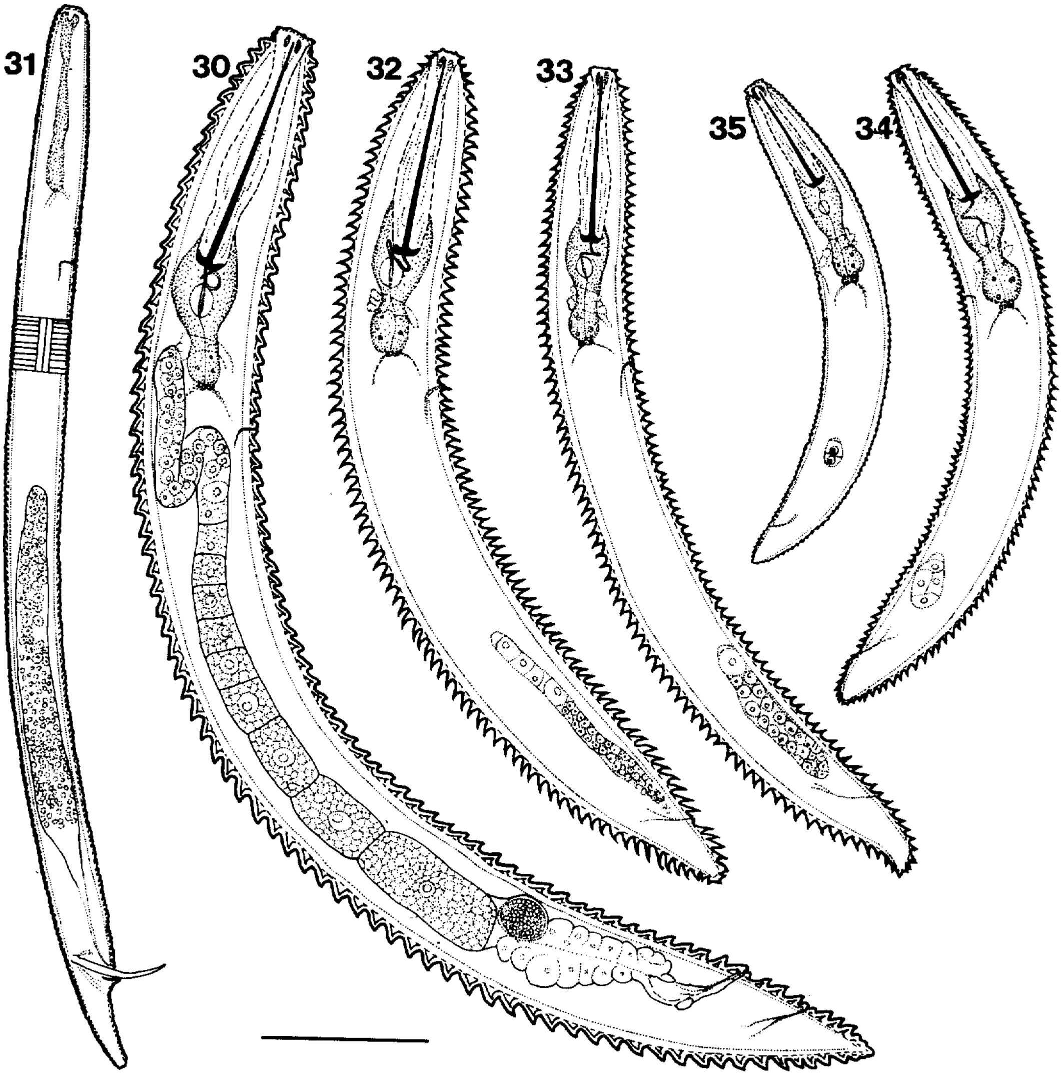
This species is characterized with the following morphologies: ten, rarely eight longitudinal rows of scales, thin and flexible stylet, almost equal diameter of head annules, and larger number of body annules (R=69-87 in Japan and R=75-94 out of Japan). The first head annules of females usually smooth in most Japanese populations, but crenate and crinkle in the Okinawa population. Numbers of scale rows are mostly ten in Japan and eight rows are recorded in single female from Mt. Aso. According to the original description, scale rows varied eight or ten in the Indian females (EDWARD *et al.*, 1970). Stylet length is shorter in Okinawa's female (53.3-63.5 μm) than those from Kyushu and Honshu (77-90.7 μm), but these differences are not significant to separate species according to the world wide range of variation of stylet length (46.3-85 μm). Including the other respects of morphological differences, these are considered to be the variations among populations in the single species.

ANDRÁSSY (1979) regarded that *O. coffeae* is a distinct species and *Criconema gracile* MEHTA & RASKI, 1971 is synonym of *O. decalineatum*. He mentioned about the infraspecific variations of outer margin of the first head annule with *O. decalineatum* as an example, and stated on the unimportance of that character. Subsequently EBSARY (1981) synonymized *C. gracile* with *O. coffeae*. As being shown in the present paper, *O. decalineatum* and *O. coffeae* are different species in the genus. Fortunately paratypes of *Criconema gracile* were available for examination, their morphologies well agree with those of Japanese specimens from mulberry fields.

OGMA DECALINEATUM (CHITWOOD, 1957) ANDRÁSSY, 1979
(Figs. 30-35, 46, 49, 55, 61, 62, 75, 76, 82, 88, 100, 119-121, 129, 135, 143, 144, 150, 155; Table 9, 10, 13)

CHITWOOD, 1957, p. 57, fig. 1 A-C (*Criconema*); ANDRÁSSY, 1961, p. 289, fig. 4 1-2 (*Criconema*); ANDRÁSSY, 1968, p. 199, fig. 15 A-E (*Criconema*); MEHTA & RASKI, 1971, p. 155-156, fig. 1 A-F (*Criconema* (*Variasquamata*)); KHAN, CHAWLA & SAHA, 1976, p. 96 (*Variasquamata*); ANDRÁSSY, 1979, p. 34 (*Ogma*); COOMANS, VINCX & DECRAEMER, 1985, p. 275-276, fig. 7 (*Ogma*); VAN DEN BERG & SPAULL, 1985, p. 24, figs. 41-45 (*Ogma*); VOVLAS, 1986, p. 195-198, figs. 1-12 (*Ogma*).

DESCRIPTIONS (mainly based on the population of Nishigoshi, Kumamoto). *Female adult* (Figs. 30, 46, 75, 76, 82, 88, 100; Table 9): Body cylindrical, stout, slightly curved ventrally after



Figs. 30–35. *Ogma decalineatum* (CHITWOOD, 1957): 30. Female adult; 31. Male adult; 32 Fourth-stage juvenile, female; 33. *Do.*, male; 34. Third-stage juvenile; 35. Second-stage juvenile. Scale bar indicates 50 μm.

treatment by gentle heat. Body annules with semicircular scales like appendages arranged in ten longitudinal rows at midbody. Head region truncate in front; of two annules, set off from body; first one finely crenate on outer margin; second annule wider than the first. Labial disk rectangular, rimed with narrow ridge, pointed to outwards at each corner; submedian lobes round; lateral lobes developed, semicircular by SEM observation. Stylet thin, flexible; knobs anchor-shaped. Esophagus ended at 94.0-136.7 μm (112.6±12.6 μm: mean ± standard deviation, n=20) from anterior end. Vulva on eleventh to thirteenth annule from the terminus; anterior vulval lip with a paired projections on the corners of its front edge. Ovary outstretched or reflexed twice, reaching the esophagus region. Spermatheca spherical with round spermatozoa. Anus on six to eight annules anterior to the tail end. Tail conical, 18.7-26.7 μm (20.9±3.8) long, with triangular scales, terminus round, not pointed.

Male adult (Figs. 31, 49, 119-121; Table 13): Body curved ventrally after heat treatment. Stylet absent. Esophagus vaguely marked, enclosed at 64.0-89.3 μm (76.3 μm: mean, n=10) from lip. Excretory pore at 80.0-102.0 μm (90.5) from anterior end. Hemizonid two-annule long, one or two annules anterior to excretory pore. Lateral field originated from few annules posterior to head, marked with three incisures, the outer two being well marked, but inner one obscure. Spicules slightly curved; gubernaculum small, flat, rod-like shaped. Tail 23.3-29.3 μm (26.1) long, conical with a pointed tip. Bursa absent. Annules 2.0-2.5 μm (2.2) wide at midbody.

Fourth-stage juvenile, female (Figs. 32, 55, 129, 135, 150; Table 10): Body shape similar to female adult but stouter. Head with two annules; first annule finely crenate, 9.7-11.3 μm (10.5 μm: mean, n=10) in diameter, second one 12.0-14.0 μm (13.0) across, with six projections on the outer margin. Body scales rectangular with few short spines on each front edge, arranged in mostly twelve to thirteen longitudinal rows at modbody. Genital primordium elongated. Anus at sixth to tenth annule from tail end. Tail length 15.3-27.3 μm (20.3), terminus roundly pointed.

Fourth-stage juvenile, male (Fig. 33; Table 10): Body slender than female juvenile. Longitudinal rows of scales ten or eleven around midbody. Scales rectangular and without spines on front edge. Genital primordium elongated oval. Tail 21.3-30.7 μm (26.4 μm: mean, n=10) long, conical.

Third-stage juvenile (Figs. 34, 61; Table 10): Body shape similar to fourth-stage juvenile but body scales less developed. Body scales rectangular, 11 to 13 per annule arranged in longitudinal rows. First head annule smooth in outer margin, 8.0-9.3 μm (8.7 μm: mean, n=10) in diameter; second one crenate, 10.0-11.7 μm (10.6) across. Genital primordium elongate oval. Tail conical, 16.0-20.7 μm (17.6) in length.

Second-stage juvenile (Figs. 35, 62, 143, 144, 155; Table 10): Body stout; scales minute, continuous each other, not arranged in longitudinal rows; genital primordium oval; tail conical, 11.0-15.7 μm (13.3 μm: mean, n=10).

SPECIMENS EXAMINED. Twenty females, males and juveniles: Nishigoshi (Kyushu National Agricultural Experiment Station), Kumamoto on June 27, 1980 (N. MINAGAWA leg.) from the rhizosphere of *Lespedeza crytobotrya* MIQ.; 8 females: Mt. Aso (860 m alt.), Nishi-yunoura, Aso-machi, Kumamoto on June 5, 1980 (N. MINAGAWA leg.) from *L. crytobotrya*; 10 females: Mt. Hamaishi, Yui, Shizuoka on March 4, 1987 (N. MINAGAWA leg.) from *Rhododendron* sp.; 20

females: Tsukuba (Natural Conservancy of the NIAES), Ibaraki on June 27, 1981 (N. MINAGAWA leg.) from *Lespedeza bicolor* TURCZ. var. *japonica* NAKAI.

REMARKS. This species is characterized with the semicircular body scales, ten longitudinal scale rows, equal sized head annules, larger number of body annules (R=75-85), and rather bluntly round tail end.

O. decalineatum originally described from Florida, USA (CHITWOOD, 1957), and reported from Reunion, Tanzania, Congo Republic, West Africa, Cuba, Paraguay, Solomon Is. and New Britain Is. (ANDRÁSSY, 1961, 1968, 1979: MEHTA & RASKI, 1971; VOVLAS, 1986). Although ANDRÁSSY (1979) synonymized with *O. gracile* to *O. decalineatum*, they can be separated from each other by the shape of tail terminus (more or less drawn out in *O. gracile* (= *O. coffeae*) and roundly pointed in *O. decalineatum*), and of the anterior vulval lips (round in outline in *O. gracile* and rectangular in outline with conical projections in *O. decalineatum*) as described by MEHTA and RASKI (1971) and in the previous part of this paper.

So far as the present study is concerned the intraspecific variations *O. decalineatum* among Japanese populations are very little. Although these V-values are slightly larger (87.3-91.5 *vs.* 85-88), and RV and Ran are smaller (RV=10-13 *vs.* 13-15 and Ran=5-8 *vs.* 6-11) than those of outsides of Japan, other morphological characteristics are almost identical and the differences are considered to be insignificant.

Genus *PSEUDOCRICONEMA* MINAGAWA, 1984

MINAGAWA, 1984, p. 374-381; SIDDIQI, 1986, p. 365 (syn. of *Ogma* (s.str.)).

DIAGNOSIS (after MINAGAWA (1984), partly revised). Family Criconematidae. *Female*: Body stout, cylindrical, narrowing towards the both ends of the body; 0.4-0.52 mm, annules 77-90, with ten longitudinal rows of scales, outlined by the conspicuously drawn out posteriorly. Body scales triangular to rectangular in shape, and rarely scale slightly notched in the posterior edge. Labial disk rectangular, separated from the submedian lobes by groove. Submedian lobes well developed, prominent, triangular to semicircular. Head annules two, differentiated from body annules; first annule lobed in outer edge, larger than the second, which shape collar like. Stylet long and flexible; knobs anchor-shaped. Vulva closed; vulval lips round to blunt triangular, anterior one not overhanging the posterior one. Vagina straight. Tail elongated conical, terminus pointed. *Male*: Body slender and cylindrical. Head end round to slightly truncate. Lateral incisures three; bursa absent; spicules 46-55 μm long and acute; gubernaculum rod like, one-seventh length of the spicule. *Juvenile* (*fourth stage*): Annules with 10 to 12 longitudinal rows of semicircular to rectangular scales, sharp spines at the tip. Tail conical, terminus pointed. Male juvenile with stylet. *Juvenile* (*second stage*): Body scales small, triangular, scatter, not arranged in longitudinal rows.

TYPE SPECIES. *Pseudocriconema japonicum* MINAGAWA, 1984

REMARKS. *Pseudocriconema* includes only the type species at the preset time, and this genus is characterized by the following aspects: 1) longitudinal rows of body scales, 2) triangular body scales, 3) lobed first head annule, 4) oval labial disk, 5) well developed triangular submedian lobes, 6) separate labial disk from the submedian lobes, 7) round to nearly triangular-shaped anterior vulval lip, and 8) straight vagina. The first and second characters are common to the part of *Ogma* (s.str.) and *Seriespinula* MEHTA & RASKI, 1971; the third, fourth, seventh and eighth are also observed in *Seriespinula*, *Crossonema* MEHTA & RASKI, 1971 and allies; the fifth and sixth are unique in *Pseudocriconema*. This genus is considered to have the intermediate characters between *Ogma* and *Seriespinula* and allies as shown above.

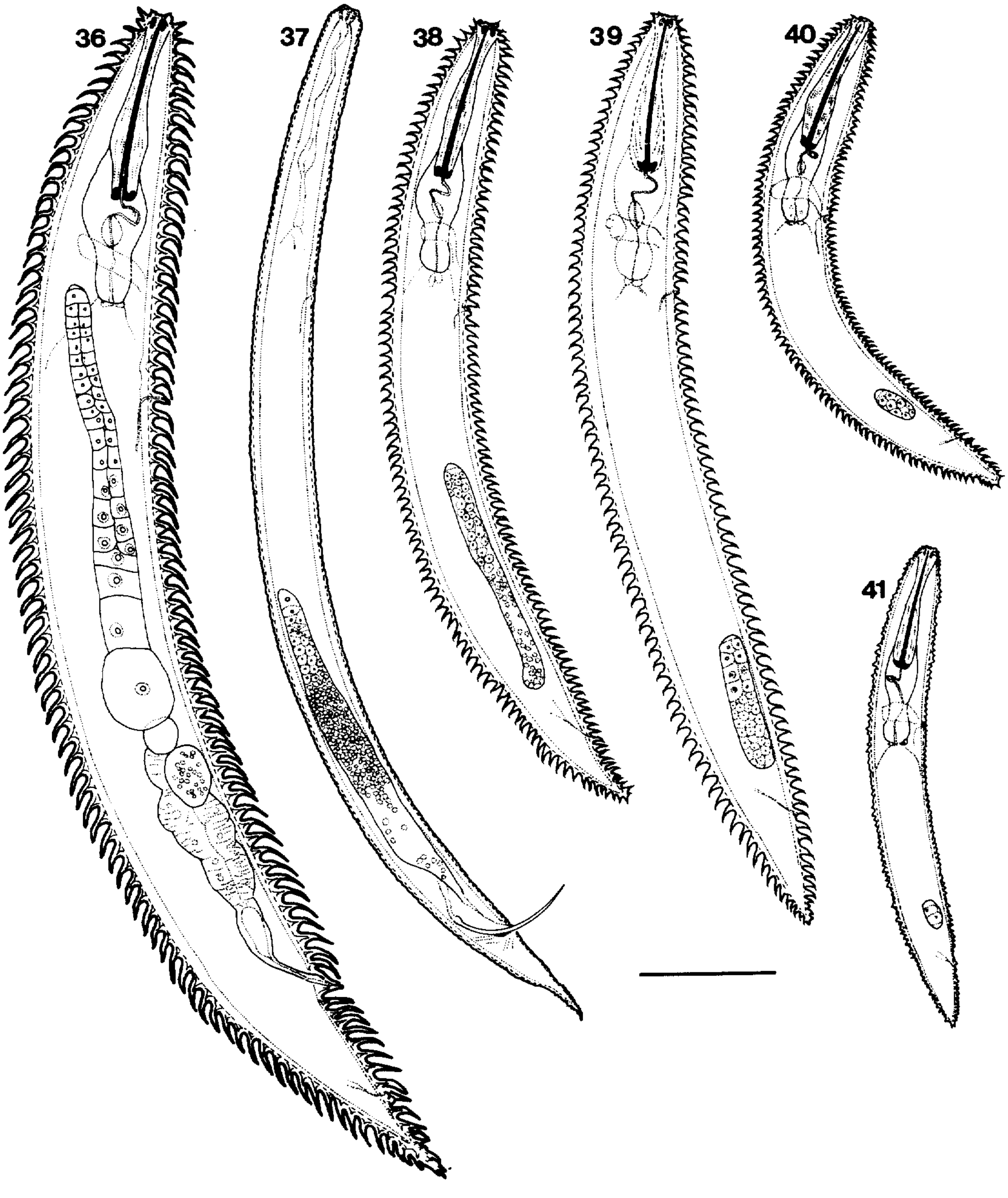
Although SIDDIQI (1986) treated *Pseudocriconema* as a junior synonym of *Ogma* (s.str.), the latter can be distinguished from this genus by the discoid but not lobed first head annule, the fused submedian lobes with the labial disk, and rectangular-shaped anterior-vulval-lip overhanging posterior one. This genus also comes close to *Seriespinula*, but they differs from each other in the morphology of face organs (submedian lobes and lateral lobes spherical in *Seriespinula*), and shape of body annules (scales usually bi- or trifurcate in the latter).

PSEUDOCRICONEMA JAPONICUM MINAGAWA, 1984
(Figs. 36-41, 47, 56, 63, 64, 101-112, 122-124, 130,
136, 145, 151, 156; Table 11-13)

MINAGAWA, 1984, p. 374-381, figs. 1-3 (*Pseudocriconema*);SIDDIQI, 1986, p. 368 (*Ogma* (s.str.)).

DESCRIPTION (after MINAGAWA (1984), partly revised; mainly based on the population from Mt. Aso, Kumamoto). *Female adult* (Figs. 36, 47, 101-112; Table 11): Body cylindrical, gradually tapering to truncated head in anterior body and to pointed tail terminus in posterior part. Body scales tri- and/or rectangular in shape with round tips, in rare cases slightly noched at middle of the front, especially in posterior body; in postvulval part of body elongated and pointed. First body annule with eight scales, second with nine, and the third to preceding annules of vulva with ten each arranged in longitudinal rows. Number of scales decreases in the post vulval body. Head annules two; first one lobes in outer margin and waved, with irregular crenations; second one circular, crinkled, with *ca.* 25 pointed spines, or blunt knobs on outer edge. Lip region with well developed submedian lobes which are triangular, round in shape, four in number and fused with labial disk, distinctly elevated from base. Stylet long, slender and flexible; knobs projecting forwardly. Esophagus typical for the family. Excretory pore lying near the level posterior to esophagus end. Annule at excretory pore rounded. Ovary outstretched, extending near the esophagus end; spermatheca oval with round spermatozoa. Vulva opened or closed; generally located on 16th or 17th annule from posterior end; vulval lips round to blunt rectangular, anterior one not overhanging the posterior. Tail elongate conical, terminus pointed.

Male adult (Figs. 37, 50, 122-124; Table 13): Body curved ventrally after gentle heat treatment. Head hemispherical, head end truncate or lightly depressed at lip region in profile. Esophagus inconspicuous. Excretory pore at the level of posterior to esophagus end. Testis single, outstretched. Both bursa and anal tubercle undeveloped. Spicules long and arched, setaceous; gubernaculum rod like. Tail elongate conical, terminus pointed; surface of terminal one-third with minute spine-like projections. Lateral field 3.3-4.0 μm (3.8 μm: mean, n=10) wide



Figs. 36-41. *Pseudociconema japonicum* MINAGAWA, 1984: 36. Female adult; 37. Male adult; 38. Fourth-stage juvenile, female; 39. *Do.*, male; 40. Third-stage juvenile; 41. Second-stage juvenile. Scale bar indicates 50 μm.

with three incisures, occasionally inner one obscure. Body annule 2.8-3.3 μm (3.0) in width around midbody.

Fourth-stage juvenile, female (Figs. 38, 56, 130, 136, 151; Table 12): Body spindle shape. Head annules two; the first annule crenate, with spines on extremity of each tooth; the second with spine-like projections as those of the first one, slightly larger than the first. In face view four rounded submedian lobes and oval labial disk are observed. Body scales generally rectangular with *ca.* 1-μm long spines, one to four in number, on each front edge. Stylet slender; knobs anchor-shaped. Scales arranged in 10 to 12, mostly 11, longitudinal rows. Excretory pore at few annules posterior to esophagus end. Anus at tenth to 13th annule anterior to the tail end. Tail conical, terminus pointed.

Fourth-stage juvenile, male (Fig. 39; Table 12): Similar to the female fourth-stage juvenile, but body slightly slender, and scale rows lesser number, and shorter and stouter genital primordium compared with the female juvenile.

Third-stage juvenile (Figs. 40, 63; Table 12): General shape similar to fourth stage. Head with two annules; first annule crenate with fine spines on outer edge; second one larger than the first. Stylet slender, knobs anchor shaped. Body scales rectangular with minute spines on front edge as those of the fourth stage, mostly arranged in 11, with some specimens in 12, longitudinal rows. Excretory pore near the level of esophagus end. Anus at eleventh to fourteenth annule from tail terminus. Tail conical, terminus pointed. Genital primordium oval to elongate oval.

Second-stage juvenile (Figs. 41, 64, 145, 156; Table 12): Body cylindrical, with minute triangular scales. Scales scattered, not arranged in longitudinal rows but irregular, about 20 per annule around midbody. Scales with minute spines on front edge by SEM observation. Head annules two, crenate, indistinct from body annules; first annule smaller than the second. Stylet knobs anchor shaped. Excretory pore around the level of isthmus. Anus at thirteenth or fourteenth annule from terminus. Tail conical. Genital primordium oval, two cells.

SPECIMENS EXAMINED. Females, males and juveniles: Mt. Aso (860 m alt.), Nishi-yunoura, Aso-machi, Kumamoto on September 2, 1979 (N. MINAGAWA leg.) from the rhizosphere of *Pieris japonica* (THUNB.) D. DON., *Hydrangea paniculata* SIEB. and *Lindera triloba* (SIEB. & ZUCC.) BLUME; females: Hirakura (Mie University Forest), Misugi, Mie on March 10, 1982 (N. MINAGAWA leg.) from *Camellia japonica* L.

REMARKS. *Pseudocriconema japonicum* is the single species in this genus and no other species to compare. This species is the similar features to some species of the closely related genera of Criconematinae in appearance, such as *Seriespinula cobbi* and *Ogma murrayi*, by their triangular body scales, however, it can be distinguished from them by the unique feature of the anterior extremity (submedian lobes and labial disk) and the characters of the genus.

Acknowledgments

I would like to express my thanks to T. NISHIZAWA, NIAES, whose continuous guidance and encouragements; T. YAEGASHI, Meiji University, who provided me the copies of valuable literature; and M. NOFFSINGER, University of California, Davis, who lent paratypes of *Criconema gracile*. My thanks are also due to following persons, who allowed to examine their nematode

specimens or cooperated to collect soil samples for study: T. YAMAMOTO, Mie Agricultural Technical Center; I. SENBONGI, Gunma Agricultural Experiment Station; E. HIRATA, Experimental Forest of University of the Ryukyus; R. IGARASHI, National Grassland Research Institute, presently Chugoku National Agricultural Experiment Station; Y. TOIDA, Sericultural Experiment Station, now Tropical Agricultural Research Center; and T. MIZUKUBO, NIAES.

Reference

1) ANDRÁSSY, I. (1961) Wissenschaftliche Ergebnisse der ersten ungarischen zoologischen Expedition in Ostafrika. II. Nematoda. *Ann. Hist.-natn. Mus. Nat. Hung., par. Zool.* 53, 281-297.

2) ANDRÁSSY, I. (1968) Fauna Paraguayensis 2. Nematoden aus den Galeriewäldern des Acaray-Flusses. *Opusc. Zool (Budap.)*, 8, 167-315.

3) ANDRÁSSY, I. (1976) *Evolution as a basis for the systematization of nematodes*. 288 pp., Pitman Publ., London.

4) ANDRÁSSY, I. (1979) Revision of the subfamily Criconematinae TAYLOR, 1936 (Nematoda). *Opusc. Zool. (Budap.)*, 16, 11-57.

5) ANDRÁSSY, I. (1985) A dozen new nematode species from Hungary. *Opusc. Zool. (Budap.)*, 19/20, 3-39.

6) BAKER, A. D. (1962) *Check lists of the nematode superfamilies Dorylaimoidea, Rhabditoidea, Tylenchoidea, and Aphelenchoidea.* 261 pp., E. J. Brill, Leiden.

7) CHITWOOD, B. G. (1957) Two new species of the genus *Criconema* HOFMÄNNER and MENZEL, 1914. *Proc. Helminthol. Soc. Wash.* 24, 57-61.

8) COBB, N. A. (1914) North American free-living fresh water nematodes. *Tans. Amer. Microscop. Soc.* 33, 69-119.

9) CHOI, Y. E. & GERAERT, E. (1975) Criconematids from Korea with the description of eight new species (Nematoda: Tylenchida). *Nematologica*, 12, 35-52.

10) COLBRAN, R. G. (1962) Studies of plant and soil nematodes, 5. Four new species of Tylenchoidea from Queensland pineapple fields. *Qd. J. agric. Sci.* 19, 231-239.

11) COLBRAN, R. G. (1963) Studies of plant and soil nematodes. 6. Two new species from citrus orchards. *Qd. J. agric. Sci.* 20, 469-474.

12) COLBRAN, R. G. (1965) Studies of plant and soil nematodes. 8. Two new species of *Criconema* (Nematoda: Criconematidae) from Queensland. *Qd. J. agric. Anim. Sci.* 22, 83-87.

13) DE CONINK, L. A. P. (1945) Sur la variabilité de *Criconema cobbi* (MICOLETZKY, 1925) et la systématique du genre *Criconema* HOFMÄNNER & MENZEL, 1914 (Criconematinae-Nematoda) avec des dennées nouvelles sur quelques éspecies du genre. *Bull. Mus. r. Hist. Nat. Belg.* 21(24), 1-31.

14) COOMANS, A., VINCX, M. & DECRAEMER, W. (1985) Nematodes from a fresh-water pool on a coral island in the Solomon Islands. *Hydrobiologia*, 123, 265-281.

15) EBSARY, B. A. (1981) Generic revision of Criconematidae (Nematoda): *Crossonema* and related genera with a proposal for *Neocrossonema* n.gen. *Can. J. Zool.* 59, 103-114.

16) EDWARD, J. C., MISRA, S. L. & RAI, B. B. (1970) *Criconema coffeae* n.sp. associated with the

roots of coffee in Mysore State, India. *Allahabad Fmr.* 44, 13-15.

17) EDWARD, J. C., MISRA, S. L., PETER, E. & RAI, B. B. (1971) A new species of *Criconema* associated with pomegranate (*Punica granatum* L.). *Indian J. Nematol.* 1, 59-62.

18) GOLDEN, A. M. (1971) Classification of the genera and higher categories of the order Tylenchida (Nematoda). In: *Plant parasitic nematodes*, Vol. I (ZUCKERMAN, B. M., MAI, W. F. & ROHDE, R. A., eds.). p. 191-232, Academic Press, New York.

19) GOODEY, J. B. (GOODEY, T.) (1963) *Soil and freshwater nematodes* (*second ed.*). 544 pp., Methuen, London.

20) GOODEY, T. (1951) *Soil and freshwater nematodes: a monograph.* 390 pp., Mehuen, London.

21) DE GRISSE, A. & LOOF, P. A. A. (1965) Revision of the genus *Criconemoides* (Nematoda). *Meded. Landbouwhogesch. Opzoekingssta. Staat Gent*, 30, 577-630

22) HEYNS, J. (1970) South Africa Criconematinae. Part 2. Genera *Criconema, Hemicriconemoides* and some *Macroposthonia* (Nematoda). *Phytophylactica*, 2, 129-136.

23) HOPPER, B. E. (1963) The males of *Criconema menzeli* (STEFANSKI, 1924) TAYLOR, 1936 and *C. octangulare* (COBB, 1914) TAYLOR, 1936 (Criconematidae: Tylenchida). *Can. J. Zool.* 41, 595-597.

24) JAIRAJPURI, M. S, (1963) *Criconema simlaensis* n.sp. (Nematoda: Criconematidae) from India. *Z. Parasitenk.* 23, 235-238.

25) JAIRAJPURI, M. S. (1964) *Criconema taylori* n. sp. (Nematoda: Criconematidae) from south India. *Nematologica,* 10, 108-110.

26) KHAN, E. & SAIDDIQI, A. H. (1963) *Criconema serratum* n. sp. (Nematoda: Criconematidae) a parasite of peach trees in Almora, North India. *Curr.Sci.* 9, 584-586.

27) KHAN, E., CHAWLA, M. L. & SAHA, M. (1976) Criconematoidea (Nematoda: Tylenchida) from India, with descriptions of nine new species, two new genera and a family. *Indian J. Nematol.* 5, 70-100.

28) KNOBLOCH, N. A. (1978) Ontogeny and identification of life-cycle stages of *Criconema octangulare* (COBB, 1914) TAYLOR, 1936. *J. Nematol.* 10, 245-249.

29) LOOF, P. A. A. & DE GRISSE, A. (1973) Interrelationships of the genera of Criconematidae (Nematoda: Tylenchida). *Med. Fac. Landbouwwet., Rijksuniv. Gent,* 38, 1303-1328.

30) MAHAJAN, R. & BIJRAL, S. S. (1973) Studies on the Criconematidae (Nematoda: Tylenchida) from India, with the description of two new speies, *Zool. Anz.* 191, 199-205.

31) MEHTA, U. K. & RASKI, D. J. (1971) Revision of the genus *Criconema* HOFMÄNNER and MENZEL, 1914 and other related genera (Criconematidae: Nematoda). *Indian J. Nematol.* 1, 145-198.

32) MENZEL, R. (1917) Zur Kenntnis der freilebenden Nematodengattung *Hoplolatimus* v. DADAY. *Rev. Suisse Zool.* 25, 153-162.

33) MICOLETZKY, H. (1922) Die freilebenden Erd-Nematoden mit besonderer Berücksichtigung der Steiner mark und der Bukowina, zugleich mit einer Revision sämtlicher nicht mariner, freilebender Nematoden in Form von Genus-Beschreibungen und Bestimmungsschlüsseln. *Arch. Naturg. (Berlin), Abt. A,* 87, 321-650.

34) MICOLETZKY, H. (1925) Die freilebend Süsserwasser- und Moornematoden Dänemarks:

Nebst Anhang: Über Amöbosparidien und andere Parasiten bei freilebenden Nematoden. *K. danske Vidensk. Selsk. Skr, math, :natur. (8)*, 10(2), 55-310.

35) MINAGAWA, N, (1984) A new criconematid nematode, *Pseudocriconema japonicum* n. gen. et n. sp. (Tylenchida: Criconematidae) from Japan, *Appl. Ent. Zool.* 19, 374-381.

36) MINAGAWA, N. (1986) Taxonomic studies of Criconematidae (Nematoda: Tylenchida) of Japan. I. Genera *Neolobocriconema, Paralobocriconema* n. gen. and *Macrocriconema* n. gen. *Bull. Natl. Inst. Agro-Environ. Sci.* 1, 95-126.

37) ORTON WILLIAMS, K. J. (1985) Some Pacific Criconematina (Nemata). *Rec. Austr. Mus.* 37, 71-83.

38) RASKI, D. J., LUC, M, & VALENZEULA, A. (1984) Redescription of *Criconema giardi* (CERTES, 1889) MICOLETZKY, 1925, type species of the genus *Criconema* HOFMÄNNER & MINZEL, 1914 (Criconematidae: Nematoda). *Revue Nématol.* 7, 301-314.

39) RASKI, D. J. & LUC, M. (1984) Areappraisal of the genus *Criconema* HOFMÄNNER & MENZEL, 1914 (Nematoda: Criconematidae). *Revue Nématol.* 7, 323-334.

40) SCHUURMANS STEKHOVEN, JR., J. H. & TEUNISSEN, R. J. H. (1938) Nématodes libres terrestres. *Explor. Parc Natn. Albert Miss. G. F. DE WITTE (1933-1935)*, 22, 1-229.

41) SIDDIQI, M. R. (1961) Studies on species of Creiconematinae (Nematoda: Tylenchida) from India. *Proc. Helminthol. Soc. Wash.* 28, 19-34.

42) SIDDIQI, M. R. & SOUTHEY, J. F. (1962) *Criconema palmatum* n. sp. (Nematoda: Criconematidae) from north Devon, England. *Nematologica,* 8, 221-224.

43) SIDDIQI. M. R. (1986) *Tylenchida parasites of plants and insects.* 645 pp., Commonwealth Agricultural Bureaux, Farnham Royal.

44) SKWIERCZ, A. T. (1982) *Nothocriconemella ina* sp. n. and observations on *Ogma murrayi* SOUTHERN, 1914 from Poland. *Nematologica,* 28, 271-276.

45) SOUTHERN, R. (1914) Clare Island survey. Part 54. Nemathelmia, Kinorhyncha, and Chaetognatha. *Proc. R. Ir, Acad.* 31, 1-80.

46) TAYLOR, A. L. (1936) The genera ane species of the Criconematinae, a sub-family of the Anguillulinidae (Nemaltoda). *Trans. Amer. Microscop. Soc.* 55, 391-421.

47) THORNE, G. (1949) On the classfication of the Tylenchida, new order (Namatoda, Phasmidia). *Proc. Helminthol. Soc Wash.* 16, 37-73.

48) THORNE, G. (1961) *Principles of nematology.* 553 pp., McGraw-Hill, New York.

49) TOIDA, Y., OHSHIMA, Y. & HIRATA, A. (1978) The nematode species associated with mulberry trees and their morpho- and ecological characteristics. *Bull. Sericultur. Exper. Sta.* 27, 369-396 (in Japanese with English summary).

50) TOIDA, Y. & MOMOTA, Y. (1981) Criconematidae from mulberry fields in Japan. *Jpn. J. Nematol.* 10, 27-34.

51) TOIDA, Y. (1983) Criconematidae (Nematoda: Tylenchida) from soil around roots of mulberry in warm climate regions of Japan, with desctiptions of two new species. *Jpn. J. Nematol.* 13, 14-19.

52) VAN DEN BERG, E. (1983) The genera *Crossonema* MEHTA & RASKI, 1971 and *Ogma* SOUTHERN, 1914 in South Africa (Nematoda: Criconematidae). *Phytophylactica,*15, 149-155.

53) VAN DEN BERG, E. & SPAULL, V. W. (1985) Some tylenchid nematodes from Aldabra Stoll with a description of a new species. *Phytophylactica,* 17, 19-25.

54) VOVLAS, N. (1986) SEM morphography of *Ogma decalineatum* (Nematoda: Criconematidae). *Revue Nématol.* 9, 195-198.

日本産ワセンチュウ科の分類学的研究
III. *Ogma* 属および *Pseudocriconema* 属

皆川　望*

摘　要

本シリーズ第3報として，1新種を含む日本産 *Ogma* 属5種，及び *Pseudocriconema* 属の1種を記載した。新種 *O.trigonolepidum* は熊本県阿蘇山の外輪山上のクヌギ及び群馬県赤城山のクルミ・クワ・サクラ・エゴノキ等の根辺から検出された。本種は体環の鱗片が縦に10列に並ぶことから，*O.simlaense, O.fotedari* に似るが，前者とは口針がより短いこと（44.5 μm 対 67—72 μm）から，後者とは体長が大きく（363—475 μm 対 270—300 μm），頭部が平たい（やや盛り上がる），頭部2体環がほぼ同じ大きさ（第1体環が第2より大きい）であること等から区別される。この他に，*Ogma* 属の次の4種を我が国から記録した。*O.brevistylum* Toida, 1983: 神奈川・静岡・三重県; *O.octangulare* (Cobb, 1914): 北海道・栃木県（わが国から新発見）; *O.coffeae* (Edward, Misra & Rai, 1970): 本州・九州・沖縄の主にクワから; *O.decalineatum* (Chitwood, 1957): 茨城・静岡・熊本県(わが国から新発見)。上記5種の雌雄成虫・幼虫について計測を行い，形態を記載し，内部，外部形態を図示した。

Siddiqi (1986)により設けられた *Ogma* 属の7亜属内，狭義の *Ogma* のみを本属と認め，他の5亜属（*Croserinema, Seriespinula, Bladicephalanema, Pateracephalanema, Pellipecten*)は，それぞれ独立した別属とした。残る *Homogma* 亜属については，模式種 *O.(H) taylata* (Khan, Chawla, Saha, 1976)と *O.(H) taylori* (Jairajpuri, 1964)を Ebsary (1981)に従って狭義の *Crossonema* 属とした。*Homogma* 亜属の他の種は，既に *Paralobocriconema* 属，*Macrocriconema* 属，*Syro* 属に移されていることから，*Homogma* 亜属を *Crossonema* 属の異名とした。改めて *Ogma* 属の定義を与え，既知の13種について検索表を示した。

Pseudocriconema 属は Siddiqi (1986)によって狭義の *Ogma* 属の異名とされた。しかし本属においては，前頭第1体環が大きく襞状であること，submedian lobe がよく発達すること，前部陰唇が半円形で *Ogma* 属の四角形とは異なること等を考慮し，*Ogma* 属からは独立した有効な属として扱い，模式種(*P.japonicum* Minagawa, 1984)を再記載するとともに，形態を図示した。

---

*環境生物部微生物管理科

現在：農林水産技術会議事務局

Table 1. Measurements and dimensions of female adult of *Ogma trigonolepidum* n. sp.

Locality	Mt, Aso Kumamoto Pref.		Mt. Akagi Gunma Pref.
	Holotype	Paratypes	Paratypes
n		25	25
L(μm)	424	363-457 (423±26)	341-433 (395±21)
a	12.3	10.3-12.9 (11.7±0.6)	10.5-13.3 (11.5±0.7)
a'	9.3	7.9-9.4 (8.6±0.4)	7.5-9.1 (8.3±0.4)
b	4.9	4.5-5.4 (4.9±0.2)	4.6-5.2 (5.0±0.3)
c	12.3	11.7-15.0 (13.2±1.4)	9.1-17.3 (12.4±1.7)
V	84.8	83.2-87.8 (85.3±1.0)	82.6-86.4 (84.7±1.0)
R	56	54-59 (56.8±1.4)	54-58 (56.6±1.2)
RV	12	11-13 (12.1±0.6)	10-13 (11.8±0.7)
Ran	7	6-8 (7.0±0.5)	6-8 (6.7±0.7)
RVan	4	3-5 (4.0±0.4)	3-5 (4.0±0.5)
Rex	17	16-19 (17.3±0.9)	15-19 (17.5±0.9)
RSt	8	8-10 (8.8±0.6)	8-10 (8.9±0.6)
ROes	13	12-15 (13.1±0.8)	12-15 (12.8±1.0)
Stylet (μm)	47.8	44.5-50.7 (47.3±1.5)	45.3-50.0 (47.5±1.1)
Prorhabdion (μm)	36.3	33.0-39.3 (36.9±1.3)	36.0-50.0 (37.4±1.0)
St. K. H. (μm)	4.9	4.1-5.0 (4.6±0.3)	4.3-5.0 (4.7±0.3)
St. K. W. (μm)	11.5	10.7-13.0 (11.8±0.6)	11.7-12.7 (12.0±0.3)
Head annule, lst (μm)	15.6	14.8-20.0 (16.2±1.2)	14.7-17.3 (16.2±0.7)
Do., 2nd (μm)	15.6	14.8-17.3 (15.9±0.7)	14.0-16.7 (15.4±0.6)
Ex. pore (%)	28.0	25.5-31.7 (28.4±1.3)	26.3-33.1 (29.2±1.4)
Scale rows	10	10	10

Figures indicate minimum and maximum values, and mean±standard deviation on parentheses.

Table 2. Measurements and dimensions of the juvenile stages of *Ogma trigonolepidim* n. sp. (population from Mt. Aso, Kumamoto Pref.)

Stage	Fourth stage		Third stage	Second stage
	Female	Male		
n	10	6	10	3
L (μm)	234-329 (278)	274-313 (296)	211-272 (230)	153-190 (177)
a	6.8-10.1 (8.7)	8.6-12.7 (11.4)	6.5-9.7 (8.3)	8.1-8.2 (8.2)
a'	5.5-7.5 (6.9)	7.9-9.8 (8.6)	5.8-7.6 (6.9)	7.2-7.3 (7.2)
b	3.2-4.0 (3.7)	4.0-5.3 (4.5)	2.9-4.0 (3.4)	2.6-3.1 (3.0)
c	7.3-11.3 (9.4)	7.5-9.4 (8.4)	8.4-9.8 (9.0)	7.8-12.1 (9.6)
R	58-63 (60.1)	59-61 (60.0)	61-64 (62.9)	64-67 (65.3)
Ran	7-10 (8.2)	8-9 (8.6)	8-10 (9.0)	9
Rex	18-22 (19.2)	19-20 (19.7)	20-23 (21.2)	24-26 (25.0)
RSt	9-11 (10.2)	9-11 (10.0)	9-13 (11.1)	14-16 (15.0)
ROes	14-18 (16.4)	14-17 (15.8)	15-21 (18.0)	24-26 (25.3)
Stylet (μm)	37.3-42.0 (40.4)	35.5-37.9 (37.0)	36.0-38.7 (37.9)	31.3-33.3 (32.5)
Prorhabdion (μm)	28.0-32.0 (30.7)	28.0-29.7 (28.7)	27.0-29.3 (27.8)	24.0-24.7 (24.5)
St. K. H. (μm)	3.0-4.0 (3.4)	2.4-4.0 (3.3)	2.7-3.3 (3.2)	2.7
St. K. W. (μm)	9.0-11.3 (10.4)	8.7-10.7 (9.2)	8.7-10.0 (9.4)	7.3-8.7 (8.2)
Ex. pore (%)	28.1-33.0 (30.9)	27.3-31.1 (29.1)	30.6-35.6 (32.7)	33.2-41.3 (36.5)
Genit. Prim. (μm)	25.3-102.0 (10.9)	37.9-80.8 (59.8)	13.3-38.7 (22.3)	8.0-8.7 (8.2)
Scale rows	10-12 (11.5)	9-10 (9.3)	11-13 (11.8)	

Figures indicate maximum and minimum value, and mean in parentheses.

Table 3. Measurements and dimensions of female adult of *Ogma brevistylum* TOIDA, 1983

Locality	Nebukawa[1] Kanagawa Pref.	Mt, Hamaishi Shizuoka Pref.	Misugi Mie Pref.
n	10	20	20
L (μm)	323-382 (356)	239-403 (298±39)	269-360 (325±23)
a	9.8-12.9 (11.2)	8.1-13.6 (10.3±1.5)	9.8-12.2 (10.9±0.8)
a'	7.9-10.5 (8.8)	6.5-10.2 (7.9±0.9)	7.8-9.8 (8.6±0.6)
b	3.2-4.4 (4.0)	2.7-3.9 (3.2±0.3)	3.7-4.7 (4.2±03)
c	9.8-13.7 (11.8)	9.5-22.4 (13.2±3.1)	9.2-18.6 (12.1±2.0)
V	83.5-86.0 (85.0)	82.0-89.0 (85.1±1.5)	80.7-86.3 (84.4±1.5)
R	61-67 (64.0)	66-73 (68.7±3.0)	58-66 (63.2±2.5)
RV	12-15 (13.5)	12-15 (13.4±0.7)	11-15 (13.2±1.0)
Ran	8-9 (8.7)	7-9 (7.9±0.7)	7-10 (8.4±0.8)
RVan	3-5 (3.8)	4-5 (4.5±0.5)	3-5 (3.9±0.7)
Rex	19-22 (21.0)	21-25 (22.8±1.3)	17-23 (20.0±1.4)
RSt	10-13 (11.2)	12-21 (17.1±2.7)	11-14 (12.2±0.8)
ROes	16-20 (17.4)	17-27 (22.7±3.0)	15-20 (16.3±1.2)
Stylet (μm)	51.1-57.7 (53.8)	57.7-67.6 (62.8±2.8)	45.3-54.7 (50.3±2.3)
Prorhabdion (μm)	41.2-47.0 (44.7)	47.8-56.1 (52.1±2.5)	37.3-45.3 (41.5±2.1)
St. K. H. (μm)	2.4-3.3 (3.0)	2.4-3.3 (2.6±0.4)	2.3-3.3 (2.7±0.3)
St. K. W. (μm)	6.6-7.4 (6.8)	6.6-8.2 (7.4±0.6)	5.7-6.7 (6.2±0.3)
Head annule, lst (μm)	13.2-14.8 (13.6)	13.2-15.6 (14.7±0.7)	12.0-14.7 (13.4±0.8)
Do., 2nd (μm)	12.3-14.0 (13.2)	13.2-14.8 (14.0±0.7)	11.7-14.0 (13.0±0.6)
Ex. pore (%)	29.6-33.9 (31.5)	26.0-34.8 (30.6±2.5)	26.5-32.8 (29.6±2.1)
Scale rows	8	8	8

Figures indicate maximum and minimum value, and mean or mean±standard deviation in parentheses. [1] Paratype specimens re-examined.

Table 4. Measurements and dimensions of juvenile stages of *Ogma brevistylum* TOIDA, 1983 (population from Misugi, Mie Prefecture).

Stage	Fourth stage	Third stage
n	5	3
L (μm)	192-238 (212)	143-170 (155)
a	8.0-9.3 (8.6)	6.6-8.0 (7.5)
a'	6.3-7.3 (6.9)	5.6-6.5 (6.1)
b	3.4-4.0 (3.7)	2.7-3.1 (2.9)
c	6.7-11.7 (9.3)	8.9-19.1 (15.8)
R	61-67 (64.0)	66-70 (68.7)
Ran	8-11 (9.6)	5-9 (6.3)
Rex	17-23 (20.5)	23-27 (25.0)
RSt	12-14 (13.2)	14-17 (15.6)
ROes	17-22 (19.6)	21-25 (23.0)
Stylet (μm)	37.3-40.7 (39.1)	33.3-36.0 (34.7)
Prorhabdion (μm)	30.7-35.3 (32.9)	26.0-28.7 (27.1)
St. K. H. (μm)	1.7-2.0 (1.9)	1.7
St. K. W. (μm)	3.7-5.3 (4.5)	4.0-5.0 (4.6)
Ex. pore (%)	26.2-33.1 (29.6)	33.7-38.7 (36.4)
Genit. Prim. (μm)	35.3-89.1 (63.3)	9.3-15.3 (11.5)
Scale rows	10-12 (10.8)	11-12 (11.7)

Figures indicate maximum and minimum value, and mean in parentheses.

Table 5. Measurements and dimensions of female adult of *Ogma octangulare* (COBB, 1914)

Locality	Shiobara Tochigi Pref.	Nopporo Hokkaido	Tomuraushi Hokkaido
n	11	25	25
L (μm)	315-442 (389)	313-443 (395±30)	304-429 (369±27)
a	7.6-12.8 (10.8)	9.5-12.6 (11.4±1.2)	8.8-13.2 (10.4±1.1)
a'	6.8-10.4 (8.9)	7.6-11.3 (9.4±0.9)	6.8-11.2 (8.4±0.9)
b	3.4-4.5 (3.9)	2.8-4.1 (3.8±0.3)	2.9-3.9 (3.5±0.2)
c	10.6-16.4 (13.0)	9.5-17.7 (13.6±1.9)	10.2-20.1 (13.4±2.4)
V	82.4-87.6 (85.7)	83.5-89.7 (87.1±1.4)	82.4-88.6 (86.2±1.5)
R	69-75 (73.0)	69-78 (74.5±2.4)	70-80 (75.0±2.6)
RV	12-15 (13.3)	12-16 (13.4±1.0)	11-15 (13.0±1.1)
Ran	7-9 (7.8)	7-10 (8.4±0.9)	6-9 (7.9±0.8)
RVan	4-6 (4.5)	3-5 (4.0±0.5)	3-5 (4.1±0.5)
Rex	20-25 (22.1)	22-26 (24.0±1.1)	22-26 (24.5±1.0)
RSt	12-14 (13.0)	11-15 (13.2±0.8)	12-19 (14.7±1.8)
ROes	17-21 (19.6)	18-24 (20.3±1.5)	19-29 (22.4±2.5)
Stylet (μm)	56.1-61.8 (58.8)	58.5-67.6 (61.7±2.8)	57.7-66.8 (63.2±2.4)
Prorhabdion (μm)	42.9-48.6 (45.5)	42.9-52.8 (47.2±2.4)	42.9-51.1 (48.0±2.2)
St. K. H. (μm)	3.3-4.1 (3.9)	3.3-4.9 (4.4±0.6)	4.1-6.6 (5.5±0.8)
St. K. W. (μm)	11.5-13.2 (11.9)	10.7-13.2 (11.7±0.6)	11.5-14.0 (12.7±0.7)
Head annule, lst (μm)	14.8-17.3 (16.2)	14.8-19.9 (16.8±1.2)	15.8-18.9 (17.6±0.9)
Do., 2nd (μm)	17.3-18.9 (18.0)	16.5-20.7 (18.1±1.1)	16.5-19.9 (18.2±0.7)
Ex. pore (%)	26.3-31.6 (28.5)	29.2-34.8 (31.4±1.7)	25.4-35.8 (30.7±2.2)
Scale rows	8	8	8

Figures indicate maximim and minimum valuem and mean or mean±standard deviation in parentheses.

Table 6. Measurements and dimensions of the juvenile stages of *Ogma octangulare* (COBB, 1914)

Stage	Fourth stage[1]		Third stage[2]	Second stage[1]
	Female	Male		
n	4	2	1	4
L (μm)	238-272 (254)	233-245 (239)	228	157-161 (159)
a	7.6-9.5 (8.7)	8.8-9.2 (9.0)	9.5	8.6-9.4 (9.0)
a'	6.3-7.6 (7.0)	6.9-7.8 (7.4)	7.6	7.9-8.3 (8.2)
b	2.9-3.6 (3.2)	2.9-3.2 (3.1)	2.8	2.3-2.4 (2.4)
c	10.5-11.5 (10.9)	8.5-10.5 (9.5)	7.6	8.3-9.3 (8.7)
R	77-81 (78.8)	76-81 (78.5)	80	89-91 (90,0)
Ran	9-10 (9.5)	9-10 (9.5)	11	11-13 (12.3)
Rex	25-28 (26.8)	25-26 (25.6)	27	29-32 (30.5)
RSt	14-18 (16.0)	15-17 (16.0)	19	19-23 (20.5)
ROes	22-26 (24.5)	25-26 (25.5)	31	34-39 (36.3)
Stylet (μm)	44.7-49.3 (47.8)	40.0-41.0 (40.5)	44,0	32.7-34.7 (33.4)
Prorhabdion (μm)	34.0-37.0 (36.1)	31.4-32.7 (32.0)	30.7	22.7-24.0 (23.1)
St. K. H. (μm)	3.7-4.3 (4.1)	3.7-4.0 (3.9)	3.0	2.7-3.3 (2.9)
St. K. W. (μm)	9.7-10.7 (10.2)	8.0-9.7 (8.9)	10.0	6.7-7.3 (7.2)
Ex. pore (%)	30.5-34.3 (32.8)	31.5-33.5 (32.5)	30.7	34.8-36.0 (35.6)
Genit. Prim. (μm)	66.7-112.0 (94.7)	40.3-46.7 (43.5)	28.7	9.0-10.0 (9.3)
Scale rows	12-15 (13.3)	12	11	

Figures indicate maximum and minimum value, and mean in parentheses.

[1] Population from Nopporo, Hokkaido. [2] Population from Tomuraushi, Hokkaido.

Table 7. Measurements and dimensions of the female adult of *Ogma coffeae* (Edward, Misra & Rai, 1970)

Locality	Kunigami Okinawa Pref.	Mt. Aso Kumamoto Pref.	Suginami Tokyo	Mt. Akagi Gunma Pref.
n	25	1	25	16
L (μm)	261-375 (326±26)	380	310-389 (352±19)	318-405 (350)
a	9.7-13.7 (11.9±1.0)	10.8	9.5-12.4 (11.0±0.7)	9.2-14.1 (11.8)
a'	8.4-11.3 (9.8±0.8)	8.9	8.4-10.6 (9.4±0.6)	8.4-11.5 (10.0)
b	2.9-4.5 (3.7±0.3)	3.2	2.6-3.3 (3.0±0.2)	2.9-3.6 (3.2)
c	8.6-19.5 (11.8±2.5)	10.9	11.0-14.9 (13.0±1.1)	11.0-19.3 (13.2)
V	79.5-88.2 (85.0±1.6)	84.7	85.1-87.8 (86.5±0.7)	85.7-89.9 (87.1)
R	69-80 (76.6±2.6)	76	78-87 (82.4±2.4)	79-86 (81.0)
RV	11-15 (13.0±1.1)	15	12-15 (13.0±0.9)	11-14 (12.5)
Ran	6-10 (8.2±1.2)	10	8-10 (8.7±0.6)	7-10 (8.4)
RVan	3-5 (3.8±0.7)	4	2-5 (3.4±0.7)	3-4 (3.1)
Rex	23-27 (25.5±1.0)	27	28-33 (29.5±1.3)	27-31 (29.1)
RSt	14-17 (15.2±1.0)	19	19-26 (21.4±1.7)	19-22 (20.5)
ROes	19-25 (21.7±1.3)	25	25-34 (28.0±2.4)	23-28 (25.9)
Stylet (μm)	53.3-63.5 (57.8±2.6)	90.0	79.2-89.1 (83.3±2.8)	74.0-90.7 (83.7)
Prorhabdion (μm)	44.5-51.1 (47.8±1.8)	77.0	66.0-79.2 (71.6±2.8)	66.7-82.0 (74.3)
St. K. H. (μm)	2.0-3.3 (2.5±0.3)	3.3	2.4-4.1 (3.2±0.3)	3.0-3.7 (3.2)
St. K. W. (μm)	6.6-8.2 (7.3±0.5)	8.7	7.4-9.0 (8.3±0.4)	7.3-8.7 (8.0)
Head annule,lst (μm)	11.3-14.0 (12.8±0.7)	13.7	11.5-15.0 (13.4±0.8)	12.0-14.7 (13.1)
Do., 2nd (μm)	11.5-14.0 (12.3±0.7)	13.7	12.3-15.0 (13.4±0.7)	12.0-14.7 (13.2)
Ex. pore (%)	30.2-34.0 (32.1±1.2)	34.6	31.1-38.4 (34.3±1.9)	31.8-38.4 (35.3)
Scale rows	10	8	10	10

Figures indicate maximum and minimum value, and mean or mean±standard deviation in paretheses.

Table 8. Measurements and dimensions of the juvenile stages of *Ogma coffeae* (Edward, Misra & Rai, 1970) (population from Suginami, Tokyo)

Stage	Fourth stage	Third stage	Second stage
n	10	10	4
L (μm)	227-290 (259)	182-248 (203)	132-140 (138)
a	8.6-12.4 (10.8)	9.1-13.1 (10.3)	6.8-9.3 (8.2)
a'	6.8-9.3 (8.4)	7.0-10.0 (8.3)	6.5-8.0 (7.4)
b	2.4-2.9 (2.6)	2.3-2.9 (2.6)	2.0-2.5 (2.2)
c	10.3-14.7 (11.9)	8.6-14.2 (10.4)	8.3-11.7 (10.0)
R	80-91 (87.0)	83-93 (87.4)	86-99 (92.5)
Ran	8-10 (9.0)	8-12 (10.4)	9-12 (11.0)
Rex	30-36 (32.2)	30-36 (33.0)	36-39 (37.3)
RSt	20-30 (24.3)	20-28 (23.1)	24-34 (29.3)
ROes	28-40 (34.0)	27-38 (32.7)	38-49 (43.5)
Stylet (μm)	64.0-77.3 (70.5)	46.7-56.7 (52.3)	34.7-38.7 (37.4)
Prorhabdion (μm)	54.7-62.0 (59.3)	39.3-48.0 (43.9)	28.0-31.3 (30.3)
St. K. H. (μm)	2.7-3.0 (2.8)	2.0-3.0 (2.5)	1.7-2.0 (1.9)
St. K. W. (μm)	7.3-8.7 (8.1)	6.0-7.3 (6.7)	4.3-5.0 (4.8)
Ex. pore (%)	34.3-41.2 (36.9)	34.4-40.9 (38.0)	33.1-40.0 (36.3)
Genit. Prim. (μm)	38.7-73.3 (64.0)	14.0-32.7 (19.5)	6.0-7.3 (6.7)
Scale rows	12-13 (12.3)	11-16 (13.3)	

Figures indicate maximim and minimum value, and mean in parentheses.

Table 9. Measurements and dimensions of the female adult of *Ogma decalineatum* (CHITWOOD, 1957)

Locality	Nishigoshi Kumamoto Pref.	Mt. Hamaishi Shizuoka Pref.	Tsukuba Ibaraki Pref.
n	20	10	20
L (μm)	351-451 (398±28)	342-445 (388)	346-427 (386±26)
a	9.2-13.9 (11.4±1.4)	8.3-12.3 (10.5)	11.7-15.3 (12.8±0.9)
a'	8.0-11.4 (9.3±0.9)	9.9-16.9 (13.6)	9.4-14.5 (10.7±1.0)
b	3.1-4.3 (3.6±0.3)	3.0-3.8 (3.5)	3.0-4.0 (3.6±0.3)
c	16.8-27.7 (19.5±2.6)	12.0-30.5 (17.4)	14.6-22.3 (17.9±2.0)
V	87.5-90.8 (89.4±0.8)	87.3-91.5 (88.8)	87.3-90.3 (88.9±0.9)
R	75-84 (79.8±2.5)	75-85 (79.7)	78-85 (81.3±2.1)
RV	10-13 (11.3±0.8)	11-13 (12.1)	10-13 (11.6±0.7)
Ran	5-8 (6.6±0.7)	6-8 (7.2)	6-8 (7.0±0.6)
RVan	3-6 (3.8±0.9)	3-5 (3.8)	3-4 (3.6±0.5)
Rex	23-28 (26.4±1.3)	24-28 (26.3)	25-30 (27.1±1.2)
RSt	15-18 (16.7±1.0)	15-22 (17.7)	16-19 (17.4±0.9)
ROes	20-26 (23.6±1.9)	22-30 (24.2)	22-26 (24.0±1.3)
Stylet (μm)	70.0-78.0 (74.0±1.9)	71.7-79.2 (76.8)	68.0-78.7 (74.0±3.1)
Prorhabdion (μm)	58.7-64.7 (62.1±1.7)	56.1-65.1 (61.7)	58.7-66.0 (62.3±2.4)
St. K. H. (μm)	3.0-4.7 (3.3±0.3)	4.1-4.9 (4.4)	2.7-4.0 (3.3±0.3)
St. K. W. (μm)	7.7-9.3 (8.6±0.5)	9.0-10.7 (9.7)	7.3-9.0 (8.2±0.5)
Head annule, lst (μm)	12.0-14.7 (12.9±0.7)	14.0-14.8 (14.5)	11.3-14.0 (12.8±0.6)
Do., 2nd (μm)	13.0-16.0 (14.5±0.7)	14.8-16.5 (15.7)	13.3-14.7 (14.1±0.5)
Ex. pore (%)	27.5-35.8 (32.1±1.8)	27.2-34.6 (31.3)	29.6-34.9 (31.7±1.2)
Scale rows	10 (n=19) or 12 (n=1)	10	10

Figures indicate maximum and minimum value, and mean or mean±standard deviation in parentheses.

Table 10 Measurements and dimensions of the juvenile stages of *Ogma decalineatum* (CHITWOOD, 1957) (population from Noshigoshi, Kumamoto Pref.)

Stage	Fourth stage		Third stage	Second stage
	Female	Male		
n	10	7	10	10
L (μm)	278-315 (295)	271-301 (291)	199-252 (218)	142-173 (164)
a	8.6-10.4 (9.6)	11.2-14.4 (12.3)	8.1-10.2 (9.2)	8.6-10.3 (9.2)
a'	7.3-8.8 (7.9)	9.1-10.8 (9.6)	6.8-8.6 (7.7)	7.9-9.7 (8.5)
b	2.9-3.3 (3.1)	3.2-3.7 (3.5)	2.5-3.2 (2.7)	2.1-2.6 (2.4)
c	11.6-18.7 (14.9)	9.5-13.4 (11.2)	11.3-14.5 (12.4)	11.0-15.5 (12.4)
R	81-85 (83.9)	81-87 (84.3)	85-92 (88.2)	89-109 (97.9)
Ran	6-10 (8.1)	9-11 (10.0)	9-12 (10.0)	9-12 (10.7)
Rex	27-30 (26.7)	24-30 (27.3)	30-32 (30.8)	34-39 (36.3)
RSt	16-20 (18.2)	16-18 (17.4)	18-23 (20.2)	21-26 (23.3)
ROes	25-30 (27.1)	25-28 (26.4)	28-37 (32.2)	36-40 (39.4)
Stylet (μm)	57.0-62.7 (59.9)	50.7-54.0 (51.9)	44.0-51.3 (47.3)	35.3-38.3 (37.4)
Prorhabdion (μm)	47.3-52.0 (49.5)	41.3-44.0 (42.7)	35.0-40.7 (38.0)	28.0-31.3 (29.9)
St. K. H. (μm)	2.3-3.3 (2.7)	2.3-3.0 (2.6)	2.0-2.3 (2.2)	1.7-2.0 (1.9)
St. K. W. (μm)	7.3-8.3 (7.8)	6.7-7.3 (7.0)	6.0-7.0 (6.3)	5.0-6.3 (5.5)
Ex. pore (%)	30.7-35.1 (33.8)	23.6-33.0 (29.7)	33.7-39.3 (35.6)	35.9-44.2 (38.9)
Genit. Prim. (μm)	64.0-103.3 (76.3)	38.0-58.7 (50.6)	16.3-25.3 (20.9)	8.0-12.7 (9.7)
Scale rows	11-13 (12.0)	10-11 (10.6)	11-13 (11.6)	

Figures indicate maximum and minimum value, and mean in parentheses.

Table 11. Measurements and dimensions of the female adult of *Pseudocriconema japonicum* MINAGAWA, 1984[1]

Locality	Mt.Aso Kumamot Pref.	Misugi Mie Pref.
n	25	25
L (μm)	400-504 (456±26)	412-521 (484±31)
a	10.6-14.5 (13.0±1.0)	12.0-15.5 (13.4±0.9)
a'	7.7-9.6 (8.8±0.5)	8.3-10.1 (9.0±0.5)
b	3.7-4.6 (4.1±0.2)	3.6-4.5 (4.0±0.2)
c	9.7-14.1 (11.3±1.1)	7.9-13.4 (10.2±1.4)
V	81.4-85.4 (83.6±1.0)	81.6-85.1 (83.4±1.0)
R	77-86 (81.0±2.3)	77-90 (81.9±3.1)
RV	15-20 (17.6±1.1)	17-20 (18.4±0.9)
Ran	8-12 (10.2±1.0)	10-15 (11.7±1.5)
RVan	5-8 (6.3±1.0)	4-8 (5.7±1.2)
Rex	25-28 (26.2±1.0)	25-32 (27.6±1.6)
RSt	13-15 (13.9±0.8)	14-18 (16.1±1.2)
ROes	19-23 (20.7±0.8)	20-25 (21.8±1.4)
Stylet (μm)	63.2-69.5 (66.0±1.9)	65.3-85.3 (80.6±5.8)
Prorhabdion (μm)	52.1-58.4 (55.2±1.6)	56.7-74.0 (68.8±4.5)
St. K. H. (μm)	3.2-4.7 (3.7±0.5)	3.0-4.0 (3.6±0.3)
St. K. W. (μm)	6.3-8.7 (7.7±0.5)	7.3-10.3 (9.2±0.6)
Head annule, lst (μm)	17.4-19.7 (18.3±0.7)	17.3-20.3 (18.7±0.6)
Do., 2nd (μm)	15.0-18.9 (16.6±1.2)	15.3-19.7 (17.1±1.0)
Ex. pore (%)	29.1-33.6 (31.0±1.3)	28.7-34.8 (31.6±1.5)
Scale rows	10	10

Figures indicate maximum and minimum value, and mean± standard deviation in parentheses. [1] After MINAGAWA (1984) and additional data.

Table 12. Measurements and dimensions of the juvenile stages of *Pseudocriconema japonicum* MINAGAWA, 1984[1] (population from Mt. Aso, Kumamoto Pref.).

Stage	Fourth stage		Third stage	Second stage
	Female	Male		
n	10	10	10	10
L (μm)	287-327 (309)	284-405 (327)	209-253 (223)	165-197 (184)
a	8.3-12.1 (9.8)	9.1-14.9 (11.1)	6.7-10.8 (9.3)	8.5-10.2 (9.3)
a'	6.5-9.0 (7.5)	7.2-11.2 (8.4)	5.6-8.7 (7.3)	7.7-9.5 (8.3)
b	3.1-3.6 (3.3)	3.3-3.9 (3.6)	2.5-3.1 (2.7)	2.0-2.6 (2.4)
c	8.2-11.1 (9.4)	7.7-8.8 (8.2)	8.3-13.9 (9.7)	8.0-11.3 (9.3)
R	82-88 (84.2)	80-89 (84.7)	79-92 (85.5)	87-98 (92.4)
Ran	11-13 (12.1)	12-15 (13.3)	11-14 (12.3)	12-14 (13.2)
Rex	26-30 (27.9)	25-29 (27.3)	26-31 (29.0)	30-35 (32.7)
RSt	14-18 (15.2)	14-17 (15.4)	16-25 (19.9)	22-25 (23.6)
ROes	22-29 (25.7)	22-27 (24.4)	25-36 (30.4)	33-44 (37.7)
Stylet (μm)	53.3-59.3 (57.0)	49.5-55.2 (52.6)	47.6-53.0 (50.7)	42.0-48.7 (45.2)
Prorhabdion (μm)	45.3-49.3 (47.8)	41.2-44.5 (43.2)	39.3-46.0 (42.6)	34.0-39.3 (37.0)
St. K. H. (μm)	2.7-3.7 (3.2)	3.3-4.1 (3.4)	3.0-3.3 (3.2)	2.7-3.3 (3.0)
St. K. W. (μm)	7.0-8.7 (7.6)	6.6-8.2 (7.5)	6.0-7.3 (6.7)	5.3-6.3 (5.8)
Ex. pore (%)	30.0-35.3 (33.1)	28.5-33.0 (30.7)	34.4-39.0 (36.1)	34.3-39.3 (37.0)
Genit. Prim. (μm)	42.0-96.0 (65.4)	36.3-90.7 (55.8)	12.0-35.3 (21.1)	9.7-10.7 (10.4)
Scale rows	10-12 (10.9)	9-11 (10.1)	11-12 (11.1)	

Figures indicate maximum and minimum value, and mean in parentheses. [1] After MINAGAWA (1984) and additional data.

Table 13. Measurements and dimensions of the male adults of *Ogma* spp. and *Pseudocriconema japonicum*

Species Locality	*O. trigonolepidum* n.sp. Mt. Aso Kumamoto Pref.	*O. brevistylum* Mt. Hamaishi Shizuoka Pref.	*O. octangulare* Nopporo Hokkaido
n	10 (paratypes)	1	3
L (μm)	244-353 (328)	360	317-351 (330)
a	10.2-15.1 (12.9)	16.9	15.1
b	3.1-4.4 (3.6)	3.9	3.5-3.7 (3.6)
c	7.3-9.8 (8.5)	10.4	9.2-11.2 (9.9)
c′	2.3-3.0 (2.5)	2.5	2.0-2.5 (2.3)
R	109-116 (112.0)	136	140-159 (148.0)
Rex	32-36 (34.2)	47	44-48 (46.3)
Rhem	30-34 (32.0)	?	42-45 (43.3)
Ex. pore (%)	24.2-28.7 (26.8)	29.1	27.9-29.0 (28.4)
T (%)	27.4-56.4 (37.5)	36.1	43.3-45.7 (44.7)
Spicules (μm)	32.2-38.0 (34.8)	28.7	37.3-42.7 (39.6)
Gubernaculum (μm)	8.0-8.8 (8.4)	6.7	7.0-7.7 (7.3)

Table 13. (continued).

Species Locality	*O. coffeae* Kunigami Okinawa Pref.	*O. decalineatum* Nishigoshi Kumamoto Pref.	*P. japonicum*[1)] Mt. Aso Kumamoto Pref.
n	1	10	10
L (μm)	310	301-345 (324)	387-433 (420)
a	16.6	15.1-17.9 (16.1)	16.1-20.9 (17.9)
b	4.4	3.4-5.2 (4.3)	4.0-4.8 (4.4)
c	10.6	10.9-14.8 (12.5)	9.1-10.8 (9.8)
c'	2.1	1.7-2.3 (2.0)	2.3-2.8 (2.6)
R	165	149-169 (160.9)	144-161 (154.6)
Rex	55	48-56 (51.8)	47-51 (49.1)
Rhem	?	49 (n=1)	43-46 (44.5)
Ex. pore (%)	28.6	26.4-29.6 (27.9)	25.6-29.4 (28.3)
T (%)	47.4	36.7-49.3 (41.5)	36.1-41.9 (38.4)
Spicules (μm)	31.3	29.3-33.3 (30.7)	46.0-54.0 (50.9)
Gubernaculum (μm)	7.7	5.7-7.3 (6.6)	6.7-8.0 (7.1)

Figures indicate maximum and minimum value, and mean in parentheses.

[1)] After Minagawa (1984) and supplemental data.

Figure legends

(p. 162; figs 42-45 x420)

Fig. 42. *Ogma trigonolepidum* n. sp. Female adult (Mt. Aso, Kumamoto), general view.
Fig. 43. *Ogma brevistylum* Toida, 1983. Female adult (Misugi, Mie), general view.
Fig. 44. *Ogma octangulare* (Cobb, 1914). Female adult (Nopporo, Hokkaido), general view.
Fig. 45. *Ogma coffeae* (Edward, Misra & Rai, 1970). Famale adult (Suginami, Tokyo), general view.

(p. 163; figs. 46-50: x420)

Fig. 46. *Ogma decalineatum* (Chitwood, 1957). Female adult (Tsukuba, Ibaraki), general view.
Fig. 47. *Pseudocticonema japonicum* Minagawa, 1984. Female adult (Mt. Aso, Kumamoto), general view.
Fig. 48. *Ogma trigonolepidum* n. sp. Male adult (Mt. Aso, Kumamoto). general view.
Fig. 49. *Ogma decalineatum* (Chitwood, 1957). Male adult (Tsukuba, Ibaraki), general view.
Fig. 50. *Pseudocriconema japonicum* Minagawa, 1984. Male adult (Mt. Aso, Kumamoto), general view.

(p. 164; figs. 51-56: x420)

Fig. 51. *Ogma trigonolepidum* n. sp. Fourth-stage juvenile: female (Mt. Aso, Kumamoto), general view.
Fig. 52 *Ogma brevistylum* Toida, 1983. Fourth-stage juvenile; female (Mt. Hamaishi, Shizuoka), general view.
Fig. 53. *Ogma octangulare* (Cobb, 1914). Fourth-stage juvenile: female (Nopporo, Hokkaido), general view.
Fig. 54. *Ogma coffeae* (Edward, Misra & Rai, 1970). Fourth-stage juvenile: female (Suginami, Tokyo), general view.
Fig. 55. *Ogma decalineatum* (Chitwood, 1957). Fourth-stage juvenile: female (Tsukuba, Ibaraki), general view.
Fig. 56. *Pseudocriconema japonicum* Minagawa, 1984. Fourth-stage juvenile, female (Mt. Aso, Kumamoto), general view.

(p. 165; figs. 57-64: x420)

Fig. 57. *Ogma trigonolepidum* n. sp. Third-stage juvenile (Mt. Aso, Kumamoto), genenal view.
Fig. 58. *Do*. Second-stage juvenle (Mt. Aso, Kumamoto), general view.
Fig. 59. *Ogma coffeae* (Edward, Misra & Rai, 1970). Third-stage juvenile (Suginami, Tokyo), general view (shrinked during dehydration process).
Fig. 60. *Do*. Second-stage juvenile (Suginami. Tokyo), general view (broken at midbody).
Fig. 61. *Ogma decalineatum* (Chitwood, 1957). Third- stage juvenile (Tsukuba, Ibaraki), general view (Shrinked).
Fig. 62. *Do*. Second-stage juvenile (Tsukuba, Ibaraki), general view (modified during dehydration process).
Fig. 63. *Pseudocriconema japonicum* Minagawa, 1984. Third-stage juvenile (Mt. Aso, Kumamoto), general view.
Fig. 64. *Do*. Second-stage juvenile (Mt. Aso, Kumamoto), general view.

(p. 166; figs. 65-76 x2,000)

Fig. 65. *Ogma trigonolepidum* n. sp. Female adult (Mt. Aso, Kumamoto), face view.
Fig. 66. *Do*. Female adult (Mt Akagi, Gunma), face view.
Fig. 67. *Ogma brevistylum* Toida, 1983. Female adult (Misugi, Mie), face view.

Fig. 68. *Ogma octangulare* (COBB, 1914). Female adult (Shiobara, Tochigi), face view.
Fig. 69, 70. *Do.* Female adult (Nopporo, Hokkaido), face view.
Fig. 71. *Ogma coffeae* (EDWARD, MISRA & RAI, 1970). Female adult (Suginami, Tokyo), face view.
Fig. 72. *Do.* Female adult (Toyono, Nagano), face view.
Fig. 73-74. *Do.* Female adult (Kunigami, Okinawa), face view.
Fig. 75. *Ogma decalineatum* (CHITWOOD, 1957). Female adult (Nishigoshi, Kumamoto), face view.
Fig. 76. *Do.* Female adult (Tsukuba, Ibaraki), face view.

(p. 167; figs. 77-88: x2,000)
Fig. 77. *Ogma trigonolepidum* n. sp. Femalt adult (Mt. Aso, Kumamoto), head (lateral view).
Fig. 78. *Ogma brevistylum* TOIDA, 1983. Female adult (Misugi, Mie), head (lateral view).
Fig. 79. *Ogma octangulare* (COBB, 1914). Female adult (Nopporo, Hokkaido), general view.
Fig. 80. *Ogma coffeae* (EDWARD, MISRA & RAI, 1970). Female adult (Suginami, Tokyo), head (lateral view).
Fig. 81. *Do.* Female adult (Kunigami, Okinawa), head (lateral view).
Fig. 82. *Ogma decalineatum* (CHITWOOD, 1957). Femalt adult (Tsukuba, Ibaraki), head (lateral view).
Fig. 83. *Ogma trigonolepidum* n. sp. Female adult (Mt. Aso, Kumamoto), vulval lips.
Fig. 84. *Ogma brevistylum* TOIDA, 1983. Femalt adult (Misugi, Mie), vulval lips.
Fig. 85. *Ogma octangulare* (COBB, 1914). Female adult (Nopporo, Hokkaido), vulval lips.
Fig. 86. *Ogma coffeae* (EDWARD, MISRA & RAI, 1970). Female adult (Suginami, Tokyo), vulval lips.
Fig. 87. *Do.* Female adult (Kunigami, Okinawa), vulval lips.
Fig. 88. *Ogma decalineatum* (CHITWOOD, 1957). Female adult (Tsukuba, Ibaraki), vulval lips.

(p. 168; figs. 89-100: x2,000)
Figs. 89, 90. *Ogma trigonolepidum* n. sp. Female adult (Mt. Aso, Kumamoto), tail.
Fig. 91. *Ogma brevistylum* TOIDA, 1983. Female adult (Misugi, Mie), tail.
Figs. 92-94. *Ogma octangulare* (COBB, 1914). Female adult (Nopporo, Hoddaido), tail.
Figs. 95-97. *Ogma coffeae* (EDWARD, MISRA & RAI, 1970). Female adult (Suginami, Tokyo), tail.
Figs. 98-99. *Do.* Female adult (Kunigami, Okinawa), tail.
Fig. 100. *Ogma decalineatum* (CHITWOOD, 1957). Female adult (Tsukuba Ibaraki), tail.

(p. 169; figs, 101-112: x2,000)
Figs. 101-103. *Pseudocricinema japonicum* MINAGAWA, 1984. Female adult (Mt, Aso, Kumamoto), face view.
Fig. 104. *Do.* Female adult (Misugi, Mie), face view.
Figs. 105-106. *Do.* Female adult (Mt.Aso, Kumamoto), head (lateral view).
Fig. 107. *Do.* Female adult (Misugi Mie), head (lateral view).
Fig. 108. *Do.* Female adult (Mt. Aso, Kumamoto), vulval lip (front view).
Fig. 109. *Do.* Female adult (Mt. Aso, Kumamoto), vulval lip (lateral view).
Figs. 110-112. *Do.* Female adult (Mt. Aso, Kumamoto), tail (lateral view).

(p. 170; figs. 113-114, 116-117,119-120,122-123: x2,000; figs. 115, 118, 121, 124: x1,400)
Fig. 113. *Ogma trigonolepidum* n. sp. Male adult (Mt. Aso, Kumamoto), head.
Fig. 114. *Do.* Male adult (Mt. Aso, Kumamoto), midbody.
Fig. 115. *Do.* Male adult (Mt. Aso, Kumamoto), tail.

Fig. 116. *Ogma octangulare* (COBB, 1914). Male adult (Noppooro, Hokkaido), head.

Fig. 117. *Do.* Male adult (Nopporo, Hokkaido), midbody (partly modified during dehydration process).

Fig. 118. *Do.* Male adult (Nopporo, Hokkaido), tail.

Fig. 119. *Ogma decalineatum* (CHITWOOD, 1957). Male adult (Tsukuba, Ibaraki), head (shrinked during dehydration process).

Fig. 120. *Do.* Male adult (Tsukuba, Ibaraki), midbody.

Fig. 121. *Do.* Male adult (Tsukuba, Ibaraki), tail.

Fig. 122. *Pseudocriconema japonicum* MINAGAWA, 1984. Male adult (Mt. Aso, Kumamoto), head.

Fig. 123. *Do.* Male adult (Mt. Aso, Kumamoto), midbody.

Fig. 124. *Do.* Male adult (Mt. Aso, Kumamoto), tail.

(p. 171; figs. 125-136: x2,000)

Fig. 125. *Ogma trigonolepidum* n. sp. Fourth-stage juvenile (Mt. Aso, Kumamoto), face view.

Fig. 126. *Ogma brevistylum* TOIDA, 1983. Fourth-stage juvenile (Misugi, Mie), face view.

Fig. 127. *Ogma octangulare* (COBB, 1914). Fourth-stage juvenile (Nopporo, Hokkaido), face view.

Fig. 128. *Ogma coffeae* (EDWARD, MISRA & RAI, 1970). Fourth-stage juvenile (Suginami, Tokyo), face view.

Fig. 129. *Ogma decalineatum* (CHITWOOD, 1957). Fourth-stage juvenile (Tsukuba. Ibaraki), face view.

Fig. 130. *Pseudocriconema japonicum* MINAGAWA, 1984. Fourth-stage juvenile (Mt. Aso, Kumamoto), face view.

Fig. 131. *Ogma trigonolepidum* n. sp. Fourth-stage juvenile (Mt. Aso, Kumamoto), head (lateral view).

Fig. 132. *Ogma brevistylum* TOIDA, 1983. Fourth-stage juvenile (Misugi, Mie), head (lateral view).

Fig. 133. *Ogma octangulare* (COBB, 1914). Fourth-stage juvenile (Nopporo, Hokkaido), head (lateral view).

Fig. 134. *Ogma coffeae* (EDWARD, MISRA & RAI, 1970). Fourth-stage juvenile (Suginami, Tokyo), head (lateral view).

Fig. 135. *Ogma decalineatum* (CHITWOOD, 1957). Fourth-stage juvenile (Tsukuba, Ibaraki), head (lateral view).

Fig. 136. *Pseudocriconema japonicum* MINAGAWA, 1984. Fourth-stage juvenile (Mt.Aso, Kumamoto), head (lateral view).

(p. 172; figs. 137-145: x2,000)

Fig. 137. *Ogma trigonolepidum* n. sp. Second-stage juvenile (Mt. Aso, Kumamoto), head (lateral view).

Fig. 138. *Ogma octangulare* (COBB, 1914). Second-stage juvenile (Nopporo, Hokkaido), head (lateral view).

Fig. 139. *Ogma coffeae* (EDWARD, MISRA & RAI, 1970). Second-stage juvenile (Suginami, Tokyo), head (lateral view).

Fig. 140. *Ogma trigonolepidum* n. sp. Second-stage juvenile (Mt. Aso, Kumamoto), tail (lateral view).

Fig. 141. *Ogma octangulare* (COBB, 1914). Second-stage juvenile (Nopporo, Hokkaido), tail (lateral view).

Fig. 142. *Ogma coffeae* (EDWARD, MISRA & RAI, 1970). Second-stage juvenile (Suginami, Tokyo), tail (latero-ventral view).

Fig. 143. *Ogma decalineatum* (CHITWOOD, 1957). Second-stage juvenile (Tsukuba, Ibaraki), head (lateral view).

Fig. 144. *Do.* Second-stage juvenile (Tsukuba, Ibaraki), tail (lateral view).

Fig. 145. *Pseusocriconema japonicum* MINAGAWA, 1984. Second-stage juvenile (Mt. Aso, Kumamoto), head (lateral view).

(p. 173; figs. 146-151: x4,000; figs. 152-156: x2,000)

Fig. 146. *Ogma trigonolepidum* n. sp. Fourth-stage juvenile (Mt. Aso, Kumamoto), body scales.

Fig. 147. *Ogma brevistylum* TOIDA, 1983. Fourth-stage juvenile (Misugi, Mie), body scales.

Fig. 148. *Ogma octangulare* (COBB, 1914). Fourth-stage juvenile (Nopporo, Hokkaido), body scales.

Fig. 149. *Ogma coffeae* (EDWARD, MISRA & RAI, 1970). Fourth-stage juvenile (Suginami, Tokyo), body scales.

Fig. 150. *Ogma decalineatum* (CHITWOOD, 1957). Fourth-stage juvenile (Tsukuba, Ibaraki), body scales.

Fig. 151. *Pseudocriconema japonicum* MINAGAWA, 1984. Fourth-stage juvenile (Mt. Aso, Kumamoto), body scales.

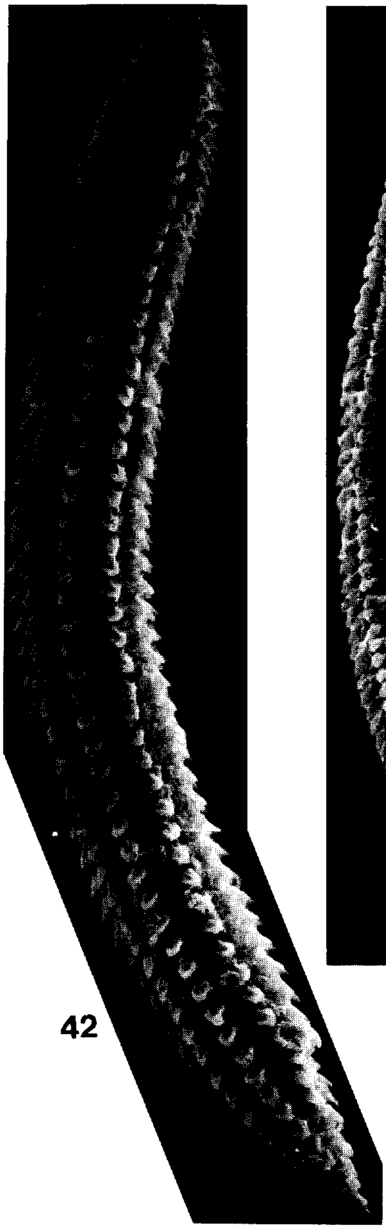
Fig. 152. *Ogma trigonolepidum* n. sp. Second-stage juvenile (Mt. Aso, Kumamoto), body scales.

Fig. 153. *Ogma octangulare* (COBB,1914). Second-stage juvenile (Nopporo, Hokkaido), body scales.

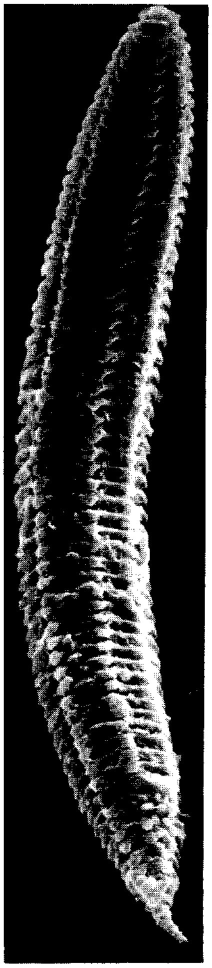
Fig. 154. *Ogma coffeae* (EDWARD, MISRA & RAI, 1970). Second-stage juvenile (Suginami, Tokyo). body scales.

Fig. 155. *Ogma decalineatum* (CHITWOOD, 1957). Second-stage juvenile (Tsukuba, Ibaraki), body scales.

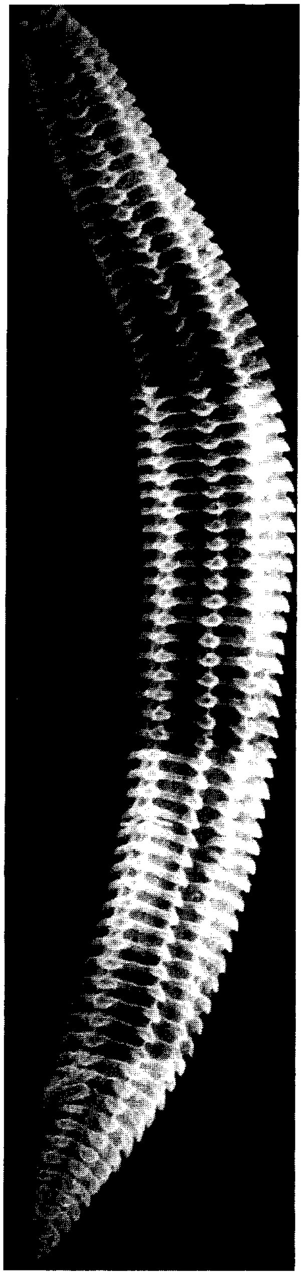
Fig. 156. *Pseudocriconema japonicum* MINAGAWA, 1984. Second-stage juvenile (Mt. Aso, Kumamoto), body scales.



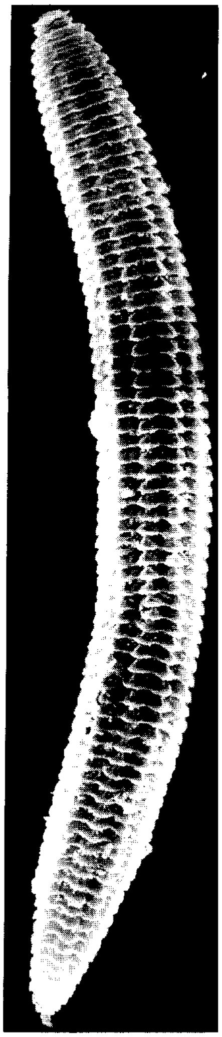
42



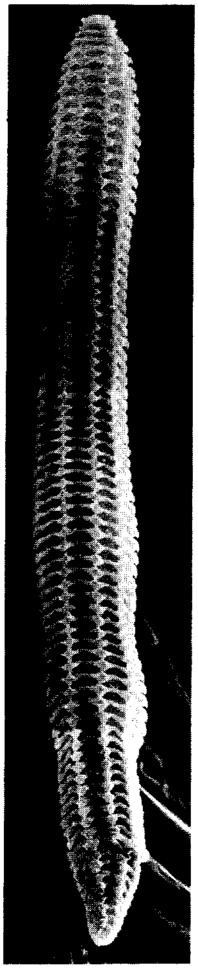
43



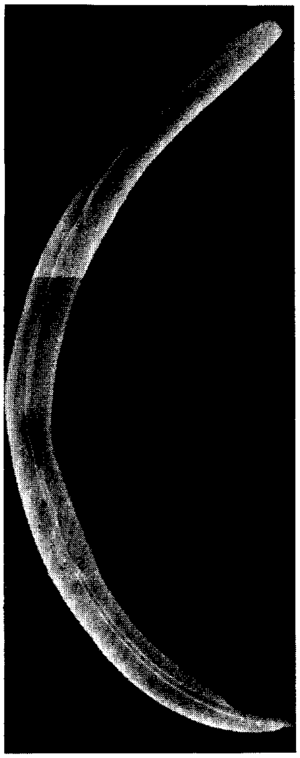
44



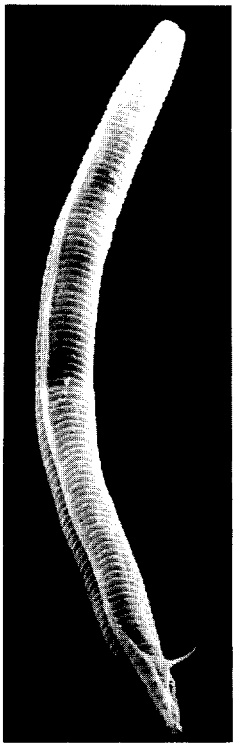
45



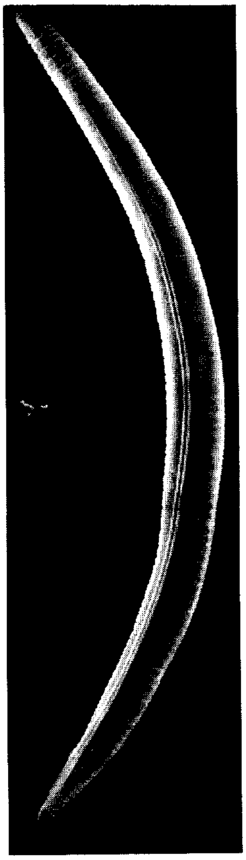
46



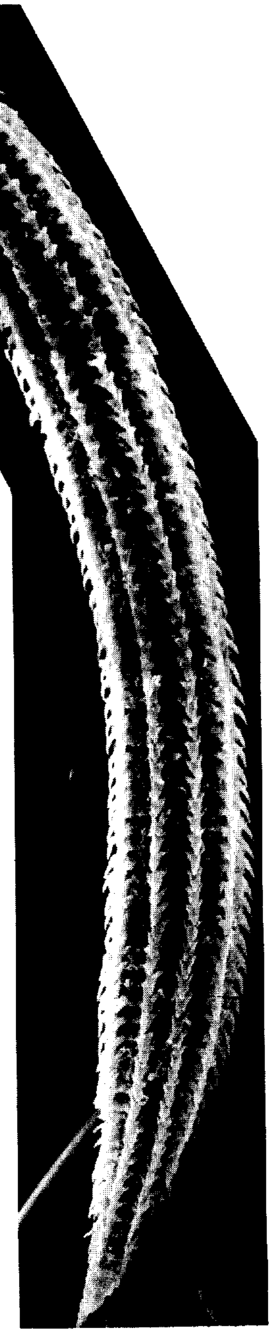
49



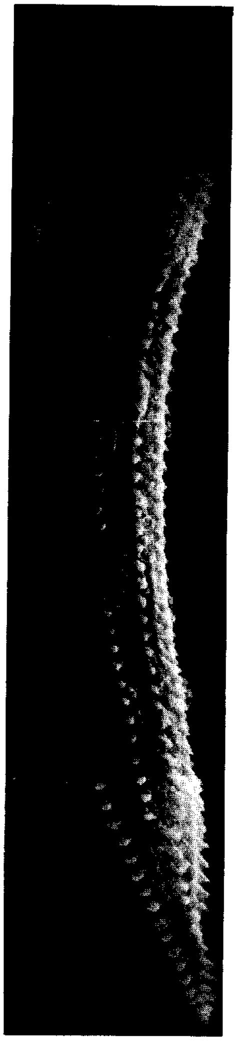
48

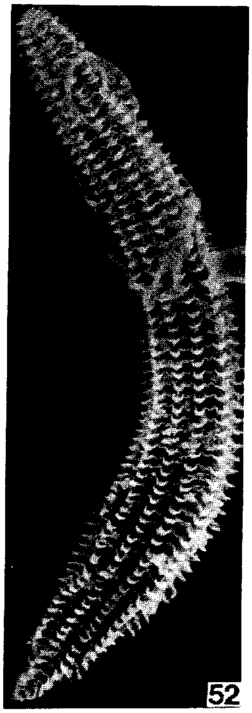


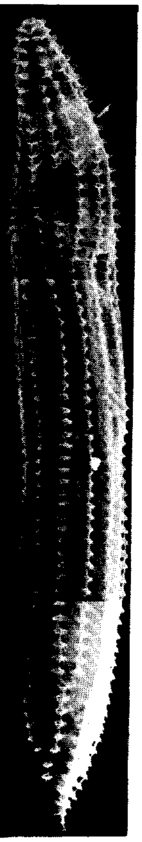
50

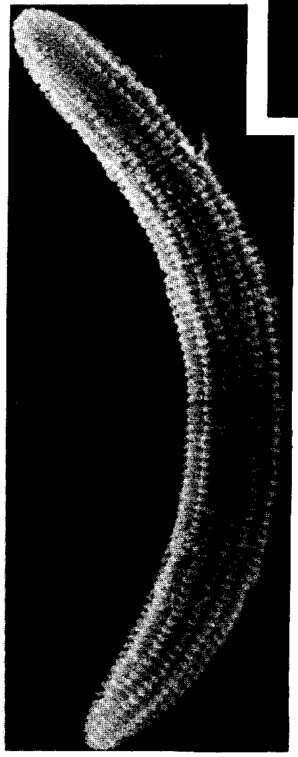


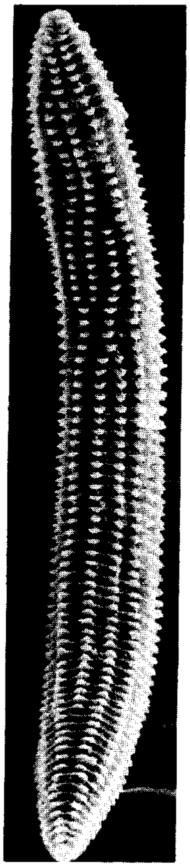
47

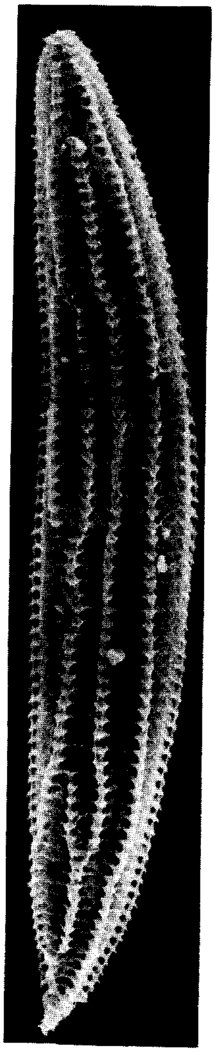

51

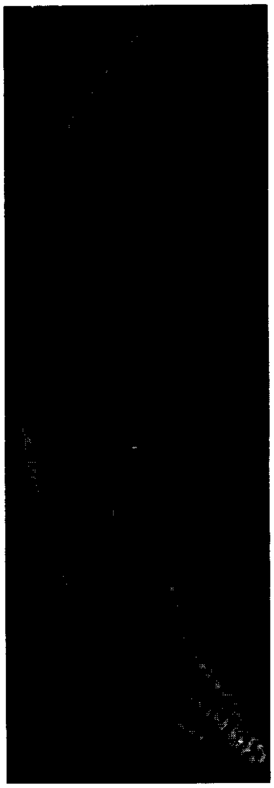

52

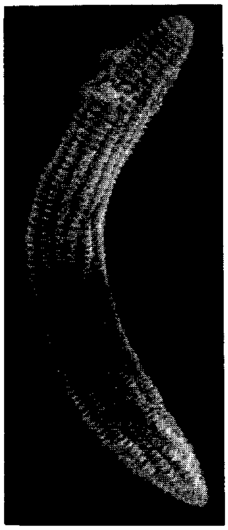

53

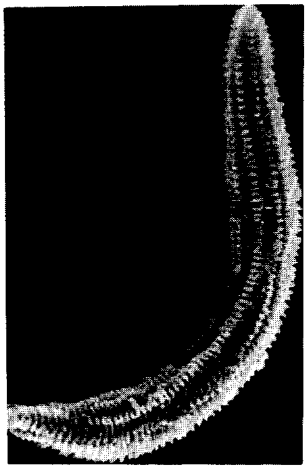

54

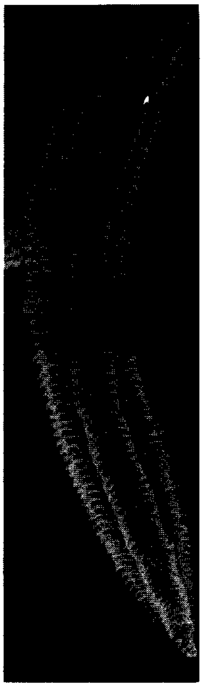

55

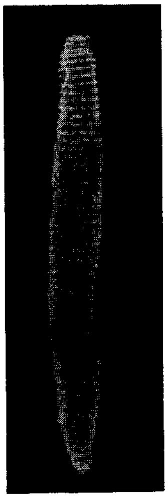

56

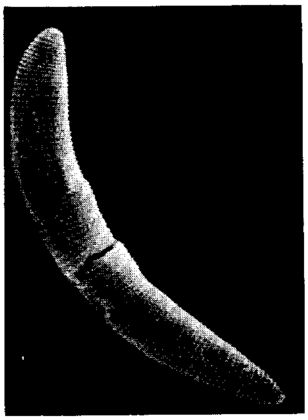

57

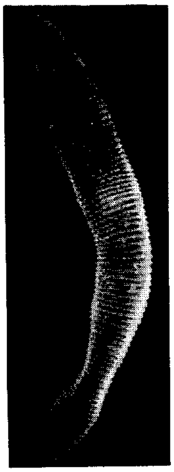

59

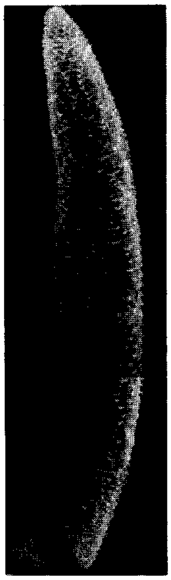

61

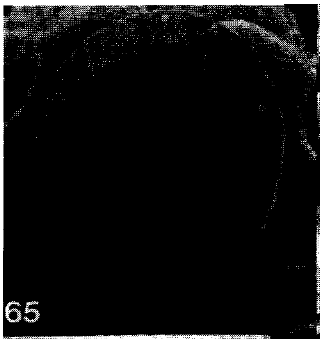

63

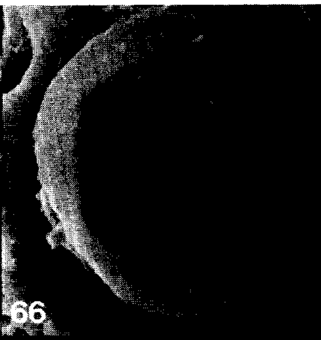

58

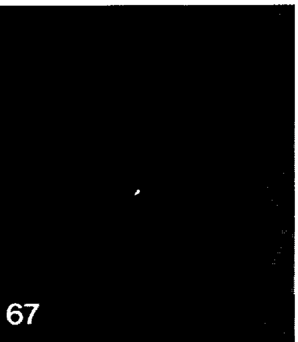

60

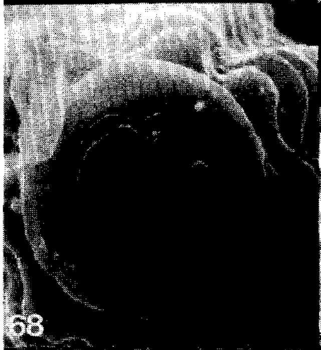

62

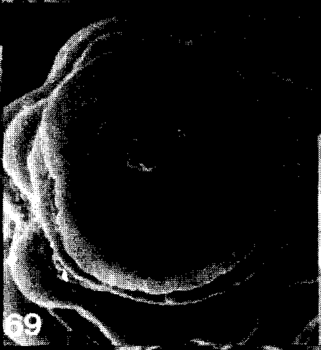

64

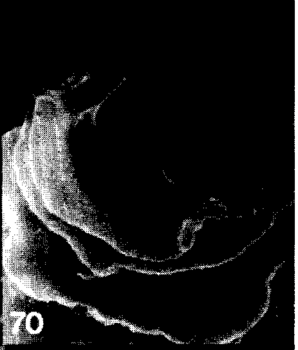

65

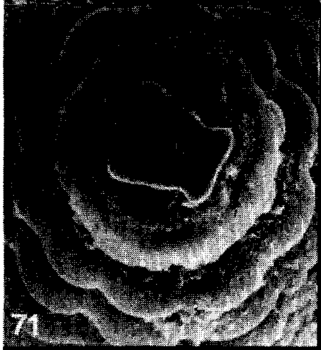

66

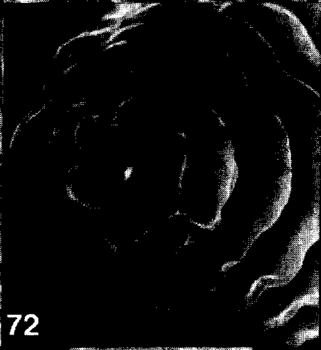

67

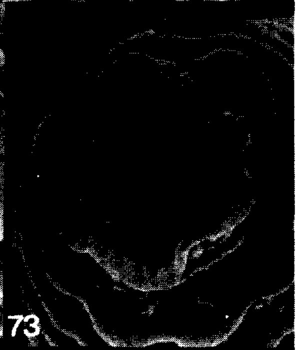

68

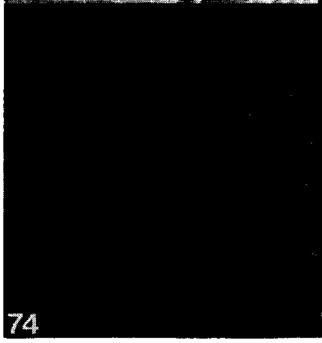

69

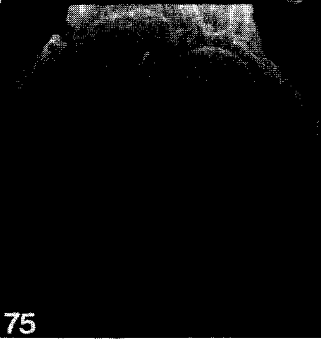

70

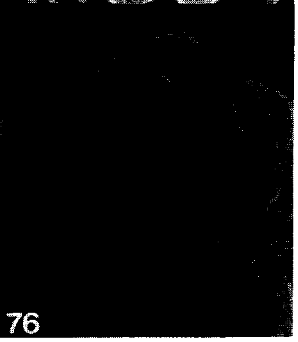

71

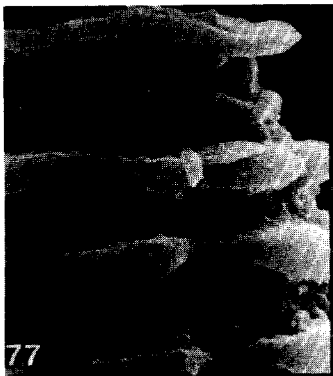

72


73

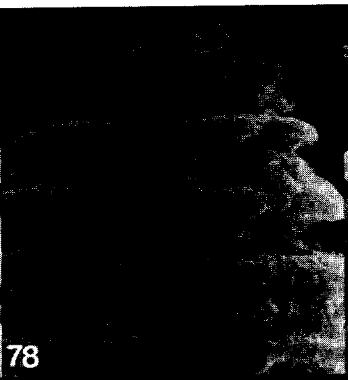

74


75

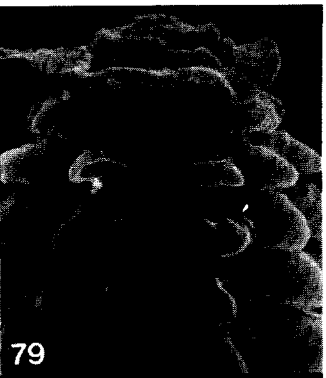

76



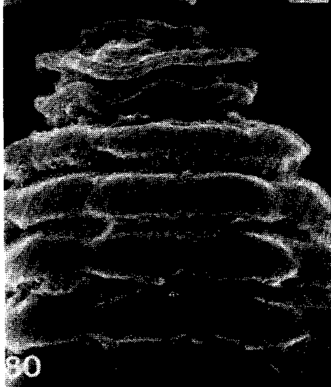
77



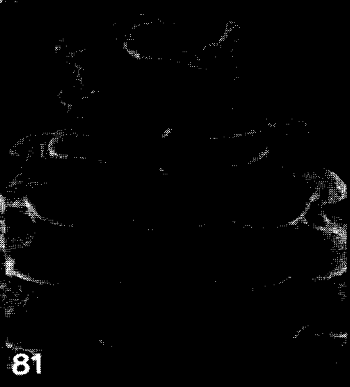
78



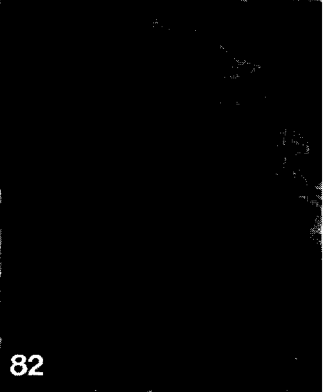
79



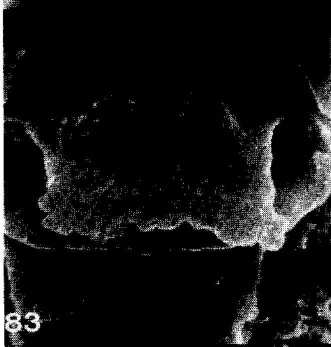
80



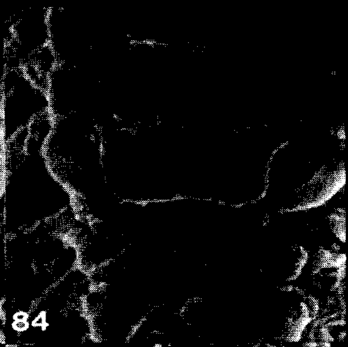
81



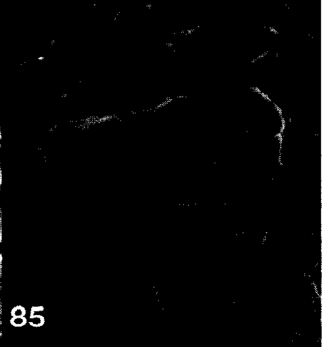
82



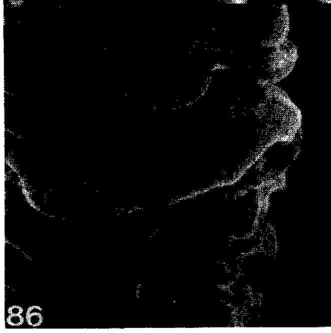
83



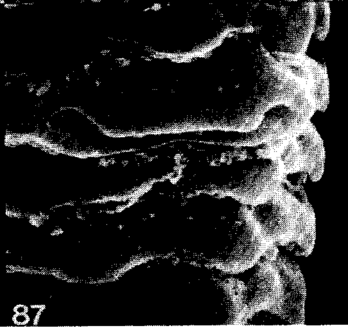
84



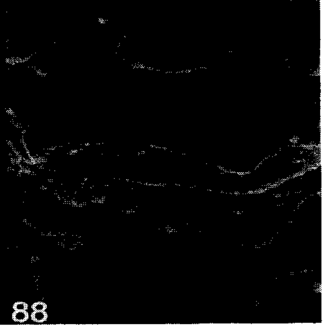
85



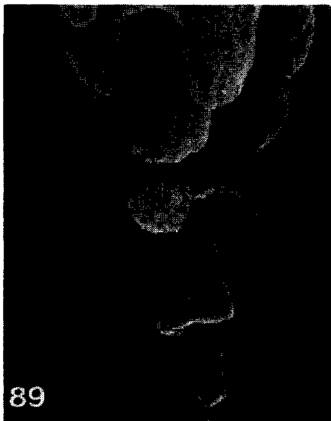
86

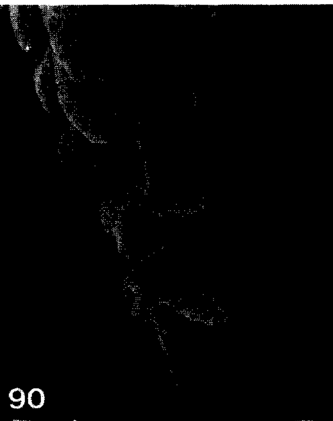


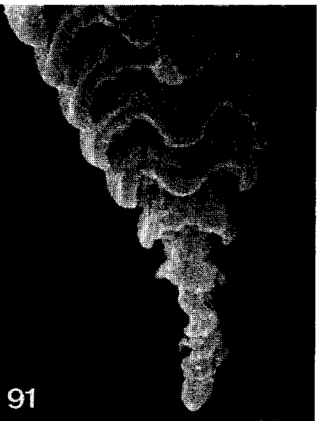
87

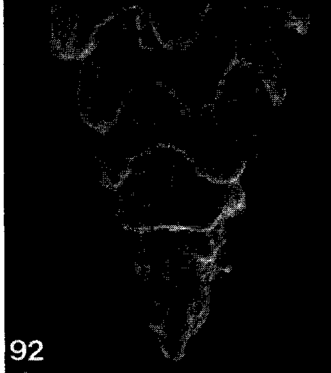


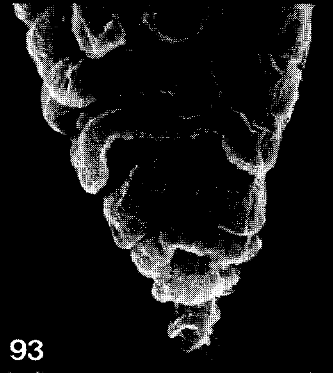
88

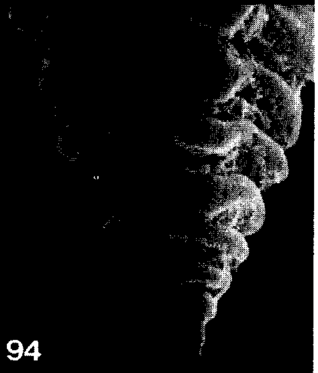

89

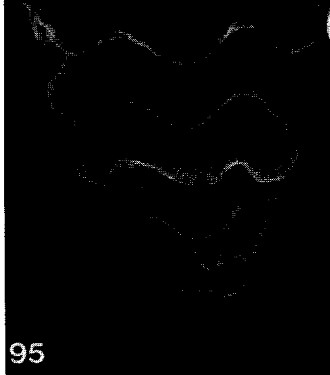

90

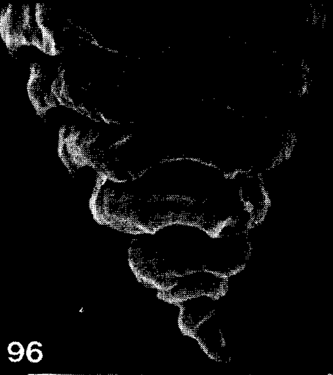

91

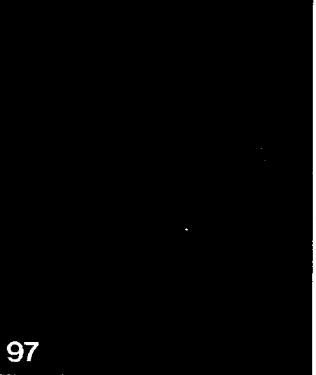

92

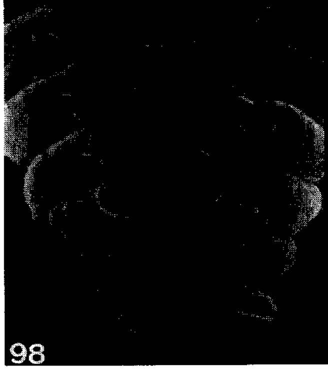

93

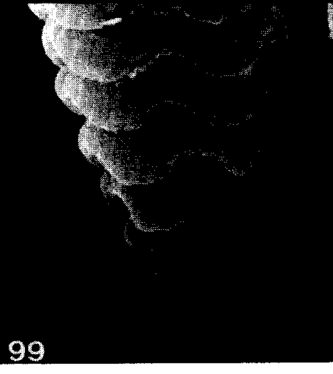

94

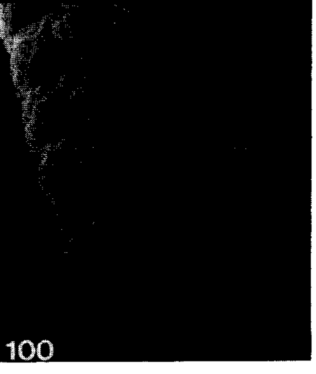

95

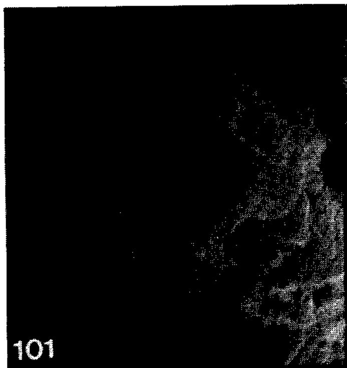

96

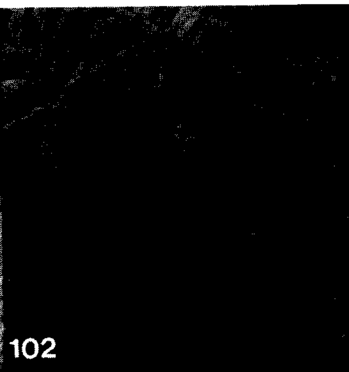

97

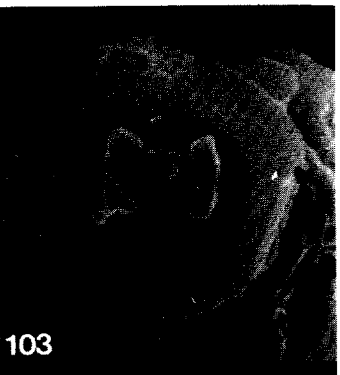

98

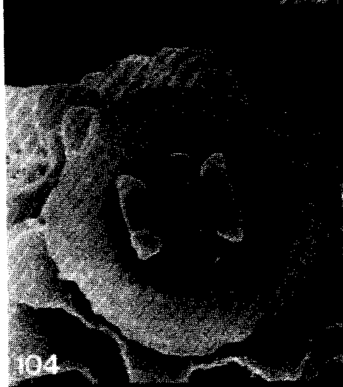

99

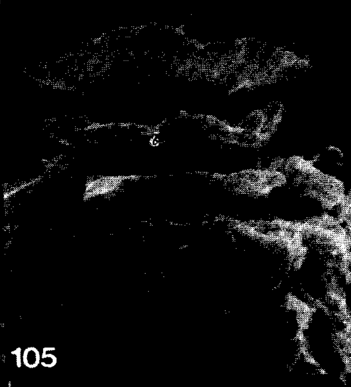

100

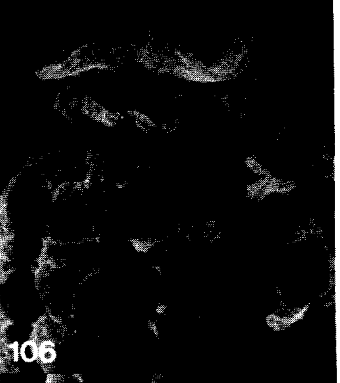

101

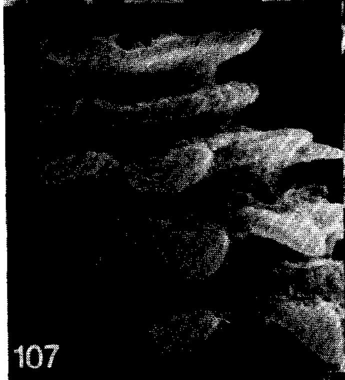

102

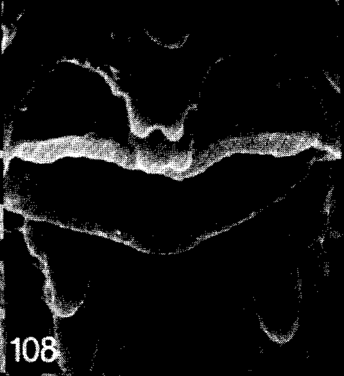

103

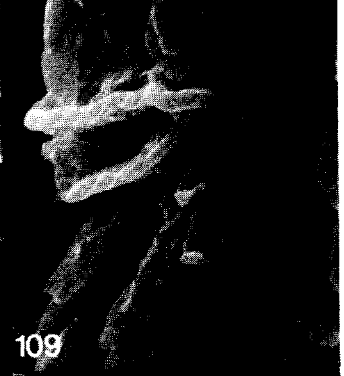

104

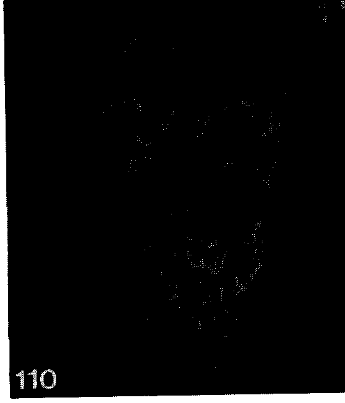

105

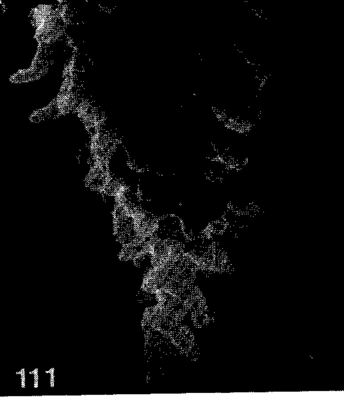

106

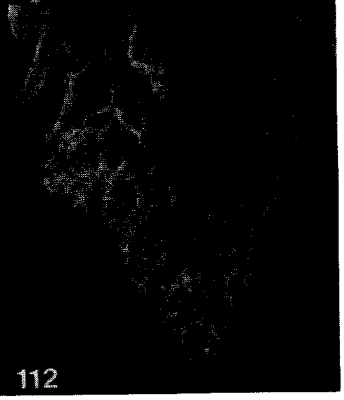

107

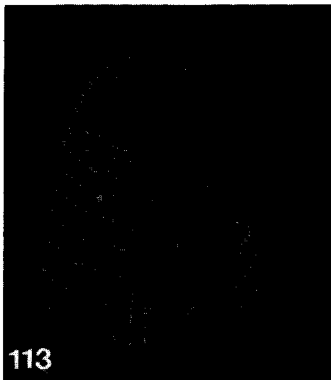

108

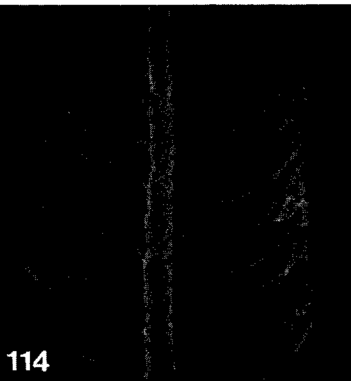

109

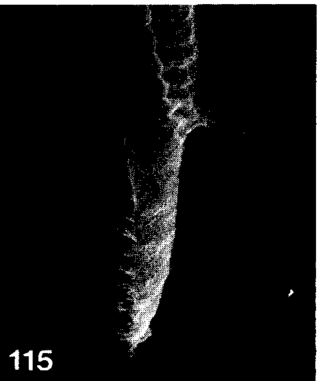

110

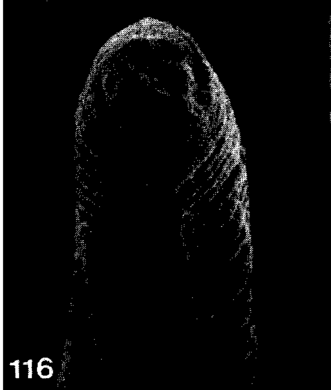

111


112

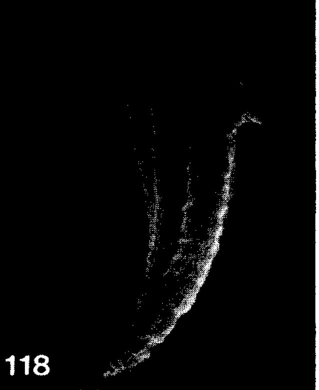

113

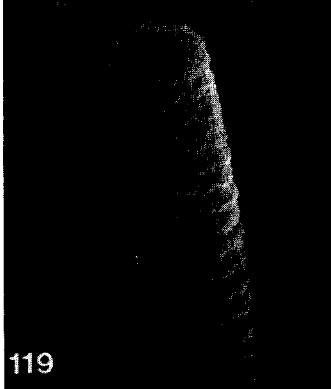

114

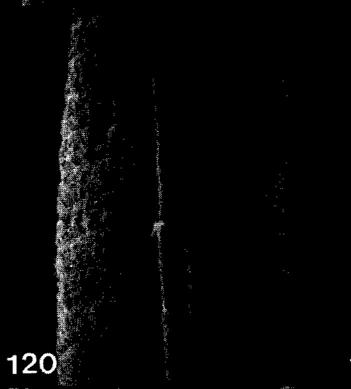

115

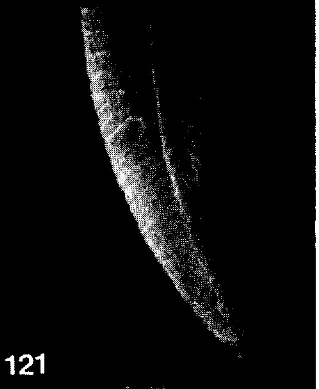

116

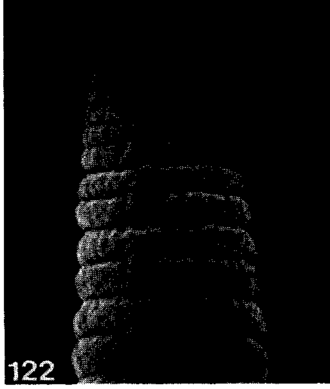
117

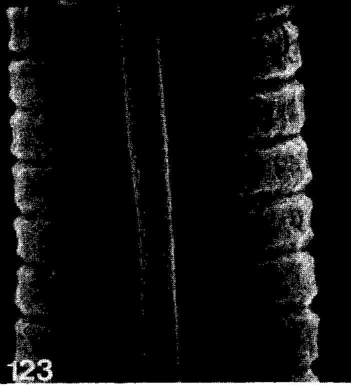

118

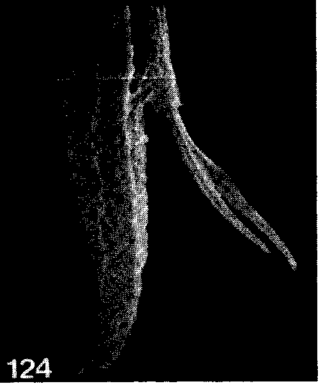

119

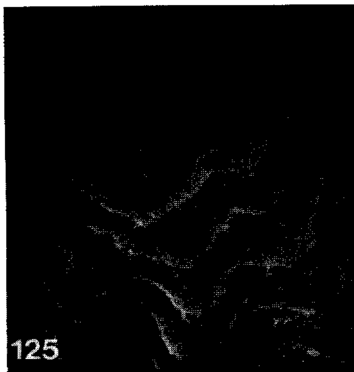

120

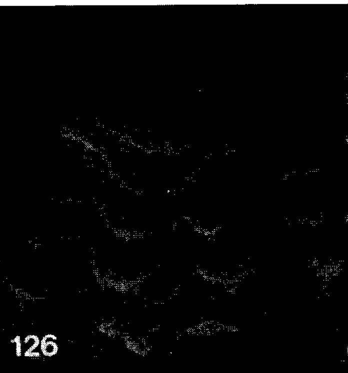

121

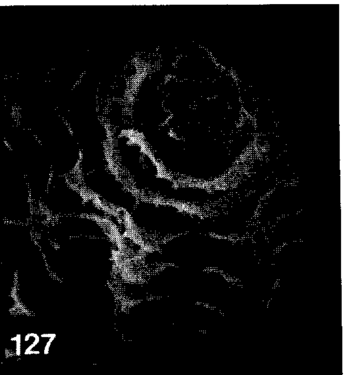

122


123

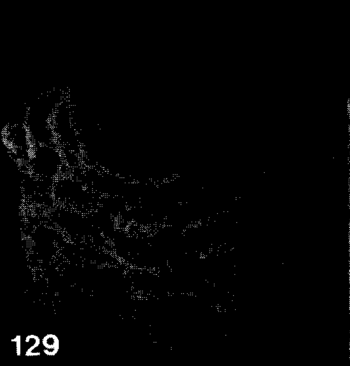

124

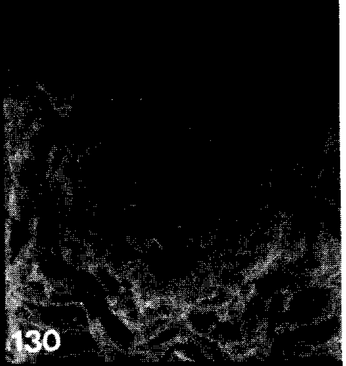

125

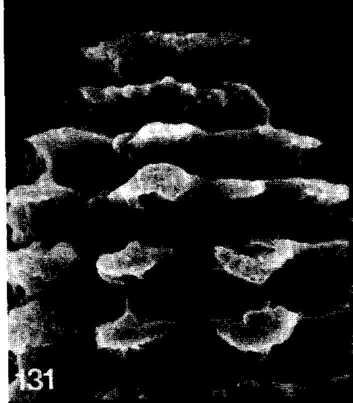

126

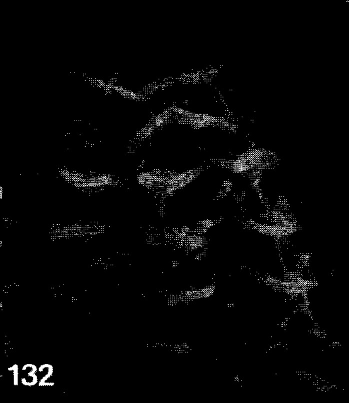

127

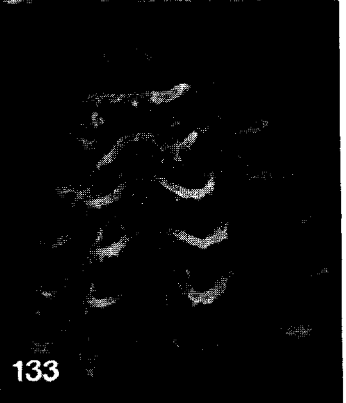
128

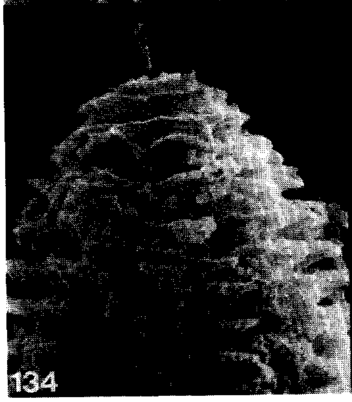

129

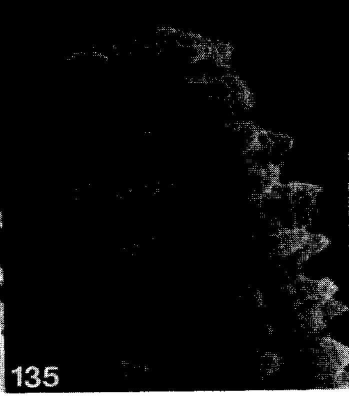

130

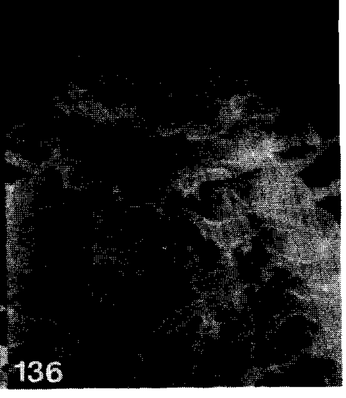

131

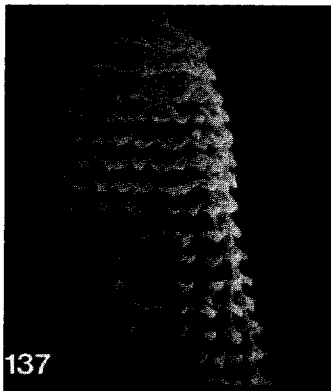

132

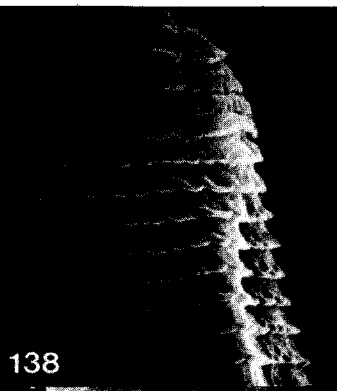

133

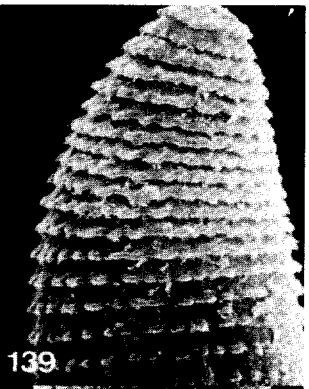

134

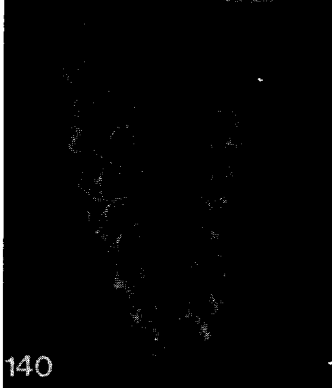

135

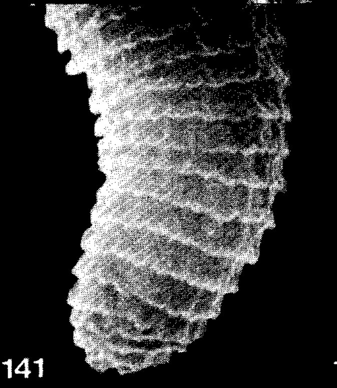

136

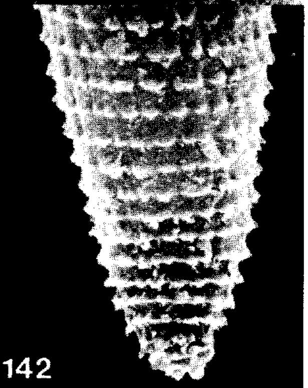

137

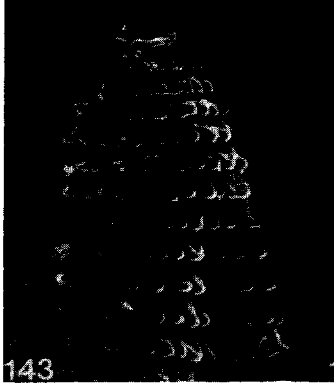

138

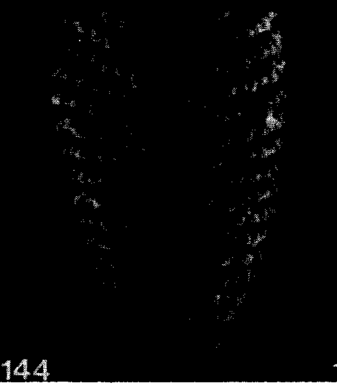

139

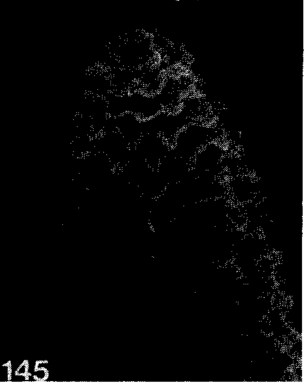

140

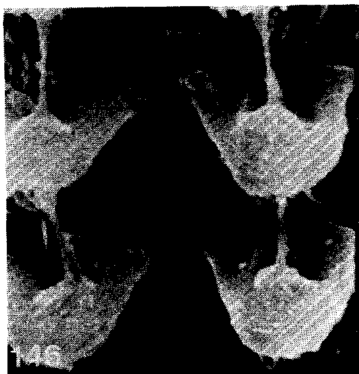

141

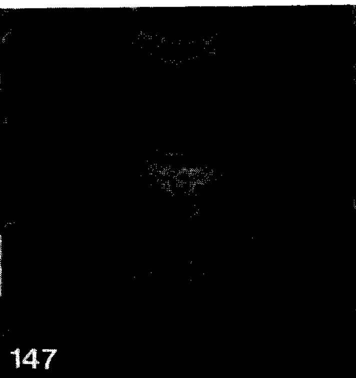

142

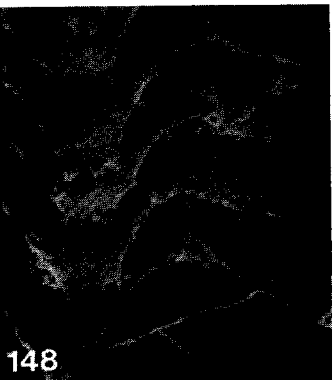

143

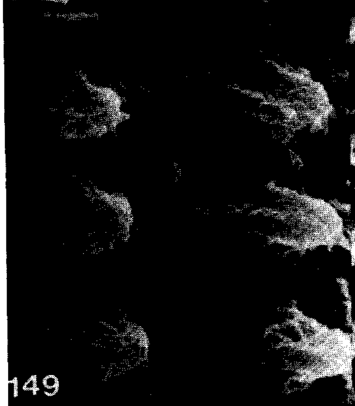

144

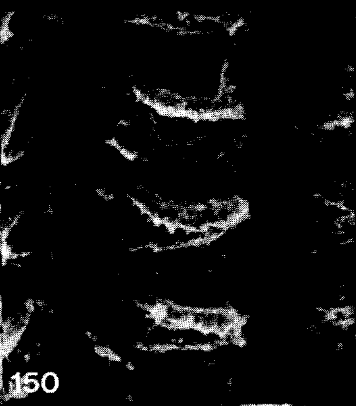

145

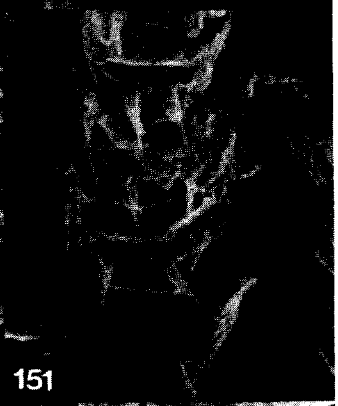

146


147

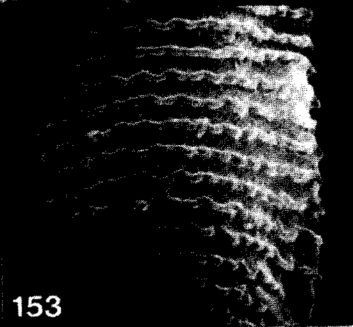

148

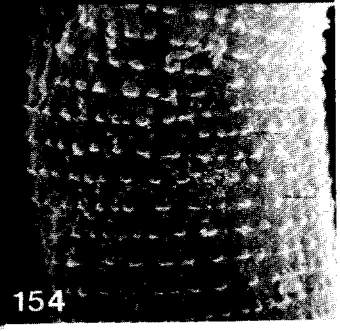

149

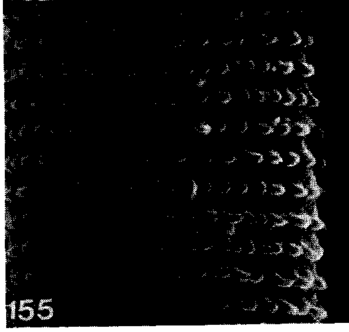

150

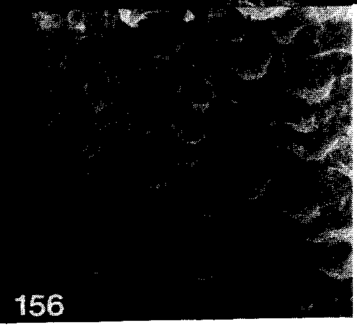

151

152


153


154


155


156